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## AEROSPACE MEDICINE

### ADVICE ON PROLONGING FLYING CAREERS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, 1983 pp 40-41

[Article by N. Rudnyy, General-Lieutenant of the Medical Service, doctor of medical sciences, professor, in the section "Psychology of Aviation Work": Do You Want To Fly for a Long Time?]

[Text] At sixty years of age Honored Test Pilot of the USSR, twice Hero of the Soviet Union General-Major of Aviation Vladimir Konstantinovich Kokkinaki passed the medical commission at the Central Scientific Research Aviation Hospital.

"Suitable for flight work without reservation", was the physicians' conclusion regarding the state of his health.

In the receiving room young flyers bombarded Vladimir Konstantinovich with questions. They were interested most of all in the question of how, in his view, they could achieve flying longevity.

"Engage in physical culture!" replied the test pilot.

Very valuable advice! After all, the combat activity of the air fighter depends a great deal on his health, physical endurance and high efficiency. All the more so since, in the process of the piloting or combat use of a modern aircraft, in addition to taking in and processing a large volume of information, he must perform complex mental operations, combining them with precise coordinated movements, make rapid calculations and remember a great deal of reference data.

The high pace of flight activity required under conditions of strict time limits, the complexity of spacial orientation out of sight of natural landmarks, and limited body movement make ever increasing demands on the pilot's health. Moreover, during a flight the crew is subjected to the action of an entire range of unfavorable factors. These circumstances pose major problems in the occupational education of flight personnel and in increasing the psychophysiological reliability of the organism and flying longevity.

Automation of the air fighter's work markedly lowers active movement, which in turn disturbs the biological rhythm of the entire organism. In controlling automatic equipment on board the aircraft, the aviator finds himself in a state of powerful nervous-emotional tension.

The brain and heart most of all react to this decrease in movement and increase in nervous activity during flight. This is why, as medical research shows, physical exercises have enormous significance for flight personnel under modern conditions. Many young aviators, however, undervalue this, regarding walking, morning running, gymnastics and tennis skeptically, preferring riding in automobiles, quiet and comfort.

In this regard, for example, Professor G. Kositskiy notes: "Lordly neglect of physical work is a tenacious survival in our psychology. There are still people who assume that the solid position which they occupy in society should be accompanied by external solidity, respectability, by which is sometimes understood overweight and imposing form. Having a certain position, some people start to think that muscular work is beneath their dignity. Such a person desires to acquire an automobile as soon as possible. And when this is achieved he becomes the slave of three spring seats: an armchair at work, ottomans at home and a soft seat in his car. And if he walks for half an hour around his dacha on Sunday, he is ready to think that he has given his due to nature and had his exercise for the week".

True words! A neglectful attitude to one's health has always resulted in harm, and all the more so in our era of rapid scientific and technological progress. It has been known from ancient times that movement as such can by its action replace any medicine, but no medicine in the world can replace movement. This thought was expressed by the famous nineteenth century French physician Tissean.

A high level of activity, including muscular activity, is the best regulator of the organism, permitting the heart, lungs, gastrointestinal tract, and endocrine glands to rapidly adapt to changing conditions in the external environment and to function normally in the most complex conditions. "Movement is a continuously pulsating fountain of energy", said the ancient Greek writer Plutarch.

It is well known that people engaging in physical culture and sport experience a restructuring in the organism, that its compensatory functional possibilities increase: the capacity to withstand fluctuations in the external environment, resistance to various forms of illness, primarily respiratory and efficiency and endurance all increase. If we consider that physical exercise evokes positive emotions, wakefulness, and a good mood, it is entirely understandable that a person, having learned the joy of physical work, will then never give up sport.

In the life of modern man emotional-intellectual forces take on paramount significance. At the present time nervous overload has increased significantly, and insufficiency of physical liveliness is sharply felt. This is also characteristic of people involved in aviation work. Few, however, sense the pernicious influence of a lack of physical training on the organism. When a person has no food he experiences a feeling of hunger, and if he needs sleep he feels sleepy. These signals force him to compensate for the lack of food and sleep. But in the absence of movement a person does not notice any signals. On the contrary, he perceives this state of rest as comfort bringing satisfaction. In actual fact he is eroding his physical strength and his health, and is, to sum up, aging.

The aviator must constantly engage in physical culture not only at the time specified by his commander, but must use for this purpose any opportunity, including periods during which he is on watch duty or waiting for take-off, in order to remove static tension from the organism. Science has shown that immobility (or hypodynamia) is one of the basic risk factors for diseases of the cardiovascular system and the gastrointestinal tract, which are complicated by neurosis. Among the other factors which create a predisposition to the development of serious illness are the use of alcohol, smoking and over-eating.

Lowering of the energy expenditure of the organism as a result of a decrease in physical activity, a neglectful attitude to physical culture and sport, and increase in consumption of high-calorie food result in a disturbance in metabolism. This manifests as overweight, obesity, which facilitates the occurrence of such serious ailments as hypertension and ischemic disease, atherosclerosis, diabetes, gallstones and others.

The task of physical training includes the development in flight personnel of emotional stability, attention, precise coordination of movement, spacial orientation and rapid reaction. At the same time physical exercises aid the flyer's organism in bearing such unpleasant factors of high-speed flight as overwork, motion sickness, hypoxia, and the hypodynamic regime, as well as lighten the burden on respiration under excess pressure.

The physical training of flight personnel is divided into basic and auxiliary training. Basic training is conducted during the process of combat training, while the subsidiary training is provided for during specific periods of retraining, for example, for flying a new type of aircraft, low-altitude flying, complex forms of combat, and resumption of flight duty after prolonged interruptions.

Taking into account the enormous significance of physical culture and sport in the training of aviators, commanders at all levels should devote constant attention to them. Yet they somehow forget to do this. I remember a meeting with young flyers who had recently graduated from flight school. Some of them spoke of the poor organization of sports activities. In flight school they were not taught gymnastics, light athletics, or other forms of sport. They used the trampoline and Reim wheel very little. It also emerged that insufficient attention is paid to physical culture in their service training itself. Activities are conducted from case to case. And this has an effect on the aviator's professional training.

For example, the unit commander reported a number of times to the squadron commander that Lieutenant Ye. Sidorov maneuvered with insufficient energy in air "combat" and was late in opening fire. It proved to be the case that the young pilot had low resistance to overwork. This conclusion was supported by oscillograms. Piloting a modern aircraft, as is well known, requires good physical conditioning. There were also shortcomings in the physical development of other young flyers. And this indicates that activities intended to strengthen the organism of air fighters should be restructured. In this regard it should be emphasized that physical culture and sport as a powerful forming medium should also be given a significant place in the psychophysiological training of the pilot.

Let us consider one of the current directions in aviation psychophysiology--the problem of retraining flight personnel in new aviation technology. Experience indicates that, in learning to fly an aircraft of a new type, aviators encounter specific difficulties associated with the restructuring of habits of piloting, aircraft handling and combat flying, as well as the difficulty of overcoming heightened emotional tension. The psychophysiological reactions of the pilot's organism during this period manifest as an increase in heart and respiratory rate, arterial pressure and body temperature, and also as metabolic changes. Research has shown that psychophysiological reactions occur 40 to 50 minutes after completion of the flight, while in an aircraft of a type with which the pilot is familiar these reactions occur on the average in 15 to 20 minutes.

In the process of retraining flight personnel and teaching them to perform complex forms of flying not only commanders but also flight physicians and directors of physical training have an important role. Their duty is to select the type of sport which a given aviator should engage in, taking into account his state of health and physical development. Thus, observable large shifts in the frequency of heart contractions in individual pilots can cause slowing of the inhibition-excitation reactions and, as a result, a deterioration of habits used in the piloting and combat flying of aircraft and helicopters. Indicative in this respect is the quality of performance of a "flight" in a trainer after a stress run of 1500 meters in six minutes. With insufficiently trained pilots fatigue significantly hampers their operation of the radiolocation sight during performance of an interception assignment. For well trained pilots, however, such a run usually becomes merely an unusual warm-up exercise before the performance of an analogous flying assignment.

For fully understandable reasons the level of physical development is not a direct indicator of an air fighter's degree of combat proficiency. At the same time combat readiness and flight safety depend on it to a large degree.

Physical culture and sports aid the air fighter in improving his health and in raising himself above the average level of biological norms. But this requires resolute character and the desire to conquer previously inaccessible heights, to struggle against weakness of will. Systematic sports activity is not necessary only to build up muscle. Physical stress is the best way to "discharge" unpleasant feelings and the best prophylaxis against disease.

The irreplaceable loss to society which drunkenness and alcoholism cause are well known. They undermine health and lower labor productivity. Unfortunately, the opinion is still prevalent that the taking of a small quantity of alcohol is harmless to a person's health. Also widespread is the erroneous idea of the allegedly stimulating effect of alcohol on the organism. Experience shows the reverse.

At a special testing unit which imitates the elements of flying activity aviators at first were able to develop stable habits. After reinforcing these habits specialists investigated the quality of the aviator's control and his ability to resist various types of interference under the influence of alcohol taken in a dose of one gram per kilogram of body weight.

The greatest decrease in the quality of flying was observed during the first three to five hours. Perception of visual and auditory signals was hampered, speed of visual perception was slowed, and visual-motor reaction time increased. These and other changes in operator activity began gradually to be restored only after seven to eight hours and approached their initial level in 12 to 15 hours.

As these scientific data show, the ingestion of even 10 grams of alcohol is accompanied by a noticeable deterioration of certain indicators of work capacity. Alcohol reduces thought processes, diminishes attention, lowers resistance to oxygen deficiency, overwork, and high and low temperatures, and promotes rapid fatigue.

Of the harmful habits which negatively affect health, the most wide-spread is smoking. Scientists in many countries have performed numerous investigations of smoking which have supported the close connection between serious diseases and the effect of nicotine. Thus, in long-term smoking, chronic intoxication of the nervous system has been observed, while diseases of the cardiovascular system, lungs and upper respiratory tract, and digestive organs, are more frequently encountered. Beside nicotine, tobacco smoke introduces into the organism carbon monoxide, hydrogen sulfide, methanol, mercury, furfural and other toxic substances. They disturb the normal rhythm of the heart, respiratory organs, central nervous system and biochemical processes, and this also has a negative effect on professional activity.

It has been shown that smoking is one of the causes of premature fatigue, lowering the resistance of the organism to overwork oxygen deficiency, motion sickness, and hallucinations during flight.

Australian scientists have done research which confirms that three cigarettes smoked before a flight lower visual perception of instrument information by 20 percent, and decrease motor reaction speed by 25 percent. A flight crew's perception of the colors red and green was particularly interfered with, as was adaptation to darkness. In this connection the nation's aviation companies, in accordance with scientists' conclusions, have adopted a resolution on the basis of which civil aviation pilots are permitted to smoke their last cigarette not later than eight hours before takeoff.

The flyer with strong character and will is able to guard himself against harmful habits and strengthen his health by means of physical training, and thereby reach the heights of professional mastery and prolong his flying career. The earlier he undertakes this effort the greater his profit from it will be.

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## PSYCHOLOGICAL HARDENING OF AVIATORS

Moscow KRASNAYA ZVEZDA in Russian 14 May 83 p 1

### Editorial

[Abstract] Current combat conditions are characterized by extreme dynamics and rapidly changing situations. The soldiers must perform under stress both of moral and physical nature. Therefore, in addition to solid training in military subjects, the soldiers must be hardened ideologically and psychologically to withstand this stress. This is especially an acute problem in the air force units. The complex technology coupled with the physical load on each pilot brings the demands on their performance to the edge of human capabilities. The basis for the formation of emotional stability is the ideological, political, moral and psychological buildup of every individual. Anecdotal references are made where such procedures helped individuals in critical situations and conversely where the lack of them led to failures. Psychological hardening of a unit depends on the commander. All commanders should use the principles of pedagogy and psychology wisely in training their subordinates.

[493-7813]

## TOUGH PROFESSIONAL TESTS

Moscow VOZDUSHNYY TRANSPORT in Russian 31 May 83 p 2

MAKAROV, R., Chairman of the Department of Physical and Psychophysiological Preparation of Airmen in Kirovograd VLU GA (unknown abbreviation), candidate of pedagogical sciences, docent

[Abstract] The airpilots' profession is prestigious, yet complex and demanding. Graduates of air academies are entrusted with a flying plant and even with human life. Therefore these individuals must be well prepared. They should be ideologically reliable, morally and politically mature, physically healthy, theoretically and academically well prepared and psychologically, physiologically and physically ready for the job. This particular commentary addresses the physical aspect of the preparedness of pilots; the Kirovograd VLU GA [possibly a Higher School for Airmen, subordinate to Civil Aviation]

found, experimentally that physically-fit individuals performed better in academic courses and in practical tests. A recommendation is made to introduce physical tests for air pilots consisting of 100, 1000 m runs and of chin-ups. Candidates and pilots should pass these tests and therefore routine physical exercises should be practiced.  
[494-7813]

EFFECTIVENESS OF THE WING OF A BIRD AS AN OSCILLATING SYSTEM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 4, Apr 83  
(manuscript received 4 Oct 82) pp 971-976

BORIN, A. A. and KOKSHAYSKIY, N. V., Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences, Moscow

[Abstract] In contrast to the usual situation in an oscillating system, in the case of a bird's wing it is external (aerodynamic) forces which perform useful work. A paradoxical situation is created: the higher the damping coefficient, the greater the effectiveness of the system. Another peculiarity of the beating wing of a bird is that the body-wing system does not include a nonmoving element and is therefore semiundefined. Clarification of the significance of the operating mode (frequency) in the effectiveness of a beating wing, considered as an oscillating system, is of great significance for the understanding of the biomechanics of bird flight. As the system operates in the resonant mode its mass and elastic element alternately accumulate energy and return it to the system without loss (excluding the hysteresis of the elastic element and mechanical friction). The wing-beating flight of actual birds is of particular interest, since their wings contain no elastic element, the constant frequency of the beat being explained by the fact that they indeed do not use resonant modes. This article derives equations which define the oscillating efficiency of the beating wings of flying birds. To simplify calculations, the beating motion of the wing is considered throughout in the vertical plane. Since they have no elastic energy accumulation mechanism, birds prevent dissipation of excessive portions of the energy of the beating of their wings by a unique compensatory mechanism--the gravimetric energy accumulator, greatly increasing the effectiveness of the work of their flying apparatus. Figures 2; references 5: 3 Russian, 2 Western.  
[484-6508]



## BIOTECHNOLOGY

### LATVIAN LYSINE PRODUCTION INCREASING

Moscow PRAVDA in Russian 17 Jun 83 p 6

[Article by PRAVDA correspondent O. Meshkov: "Following the Experiment"]

[Text] Preylskiy Rayon, Latvian SSR--The experimental biochemical plant located in the small Latvian town of Livany has been for a long time the leader among sector enterprises. They produce lysine there--a valuable protein additive for livestock farming. The design capacity of the plant has long since been more than doubled, but each year the chemists increase output by 100 to 150 tons.

"Of course, there are many difficulties," M. Spaskovskaya, a shift chief at the leading No 1 shop at the plant tells us. "Our product is unique and it requires particularly careful observance of technology. And unforeseen situations can arise. But now we have gained experience and output has been assimilated. And perhaps we can show how the lysine has started to grow by itself."

One way of increasing output has been competition among the brigades doing similar work. Earlier, each shift was concerned only with its own indicators; it was from these that its work was evaluated. Now, the shifts handling the same equipment are interested in the final result. Thanks to this, for example, the members of the brigade including apparatus handlers V. Smirnova, I. Briksha, I. Svikla and others obtain 40 grams of lysine from each liter of biological solution. This is the highest index in the sector. The leaders' experience is studied at occupational skill improvement sessions. Incidentally, the organization of this kind of training at the plant has also been recognized as model among similar enterprises. As a rule, therefore, the differences in brigade results are not large.

The chemical workers at Livany are proud that they produce lysine 1.5 times more cheaply than the average for the country. How is this achieved? V. Levane, senior engineer at the central laboratory told us: "At present, one of the components for obtaining lysine is an expensive protein vitamin concentrate. Plant specialists have developed a technology that uses waste from flax processing, a raw material much more readily available and cheaper. True, it called for some modifications of the mechanisms, but the foreman

of the hydrolysis section N. Smirnov and other innovators dealt with that excellently. As a result we shall be able to save thousands of tons of raw materials each year."

It must be said that you sense the strength of engineering thought in everything at the plant. Each specialist has a personal creative plan. In its time this helped in reaching design capacities more rapidly. The need arose to produce the lysine in granulated as well as liquid form. A group led by Ya. Boyars, chief of the design section, set about developing a special dryer for this. Their pledge was completed on time. Now, half the total output volume of lysine is produced in granular form.

In cooperation with the scientists of the republic Academy of Sciences the chemists have developed new technology for producing a complex fodder additive based on lysine, namely, vitamin amino acid premixes. This development was marked with the award of a Latvian SSR state prize.

At the plant they are now installing a new evaporation installation that operates semiautomatically. It will help in reducing losses even further. And the chemists have already calculated that this year the tradition will not be changed: lysine production will be increased again by 150 tons.

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CSO: 1840/516

## BRIEF

LACTIC FERMENTATION RESEARCH--Dozens of new bacterial strains used in medicine, the food industry and fodder production have been isolated at the Armenian SSR Academy of Sciences Institute of Microbiology Laboratory of Zymotic Organisms under the leadership of Doctor of Biological Sciences L. Yerzinkyan. More than 6 months have passed since the publication in PRAVDA of the reportage on "Narine," a tonic lactic fermentation liquor, and comments are still coming in. The bustle in the laboratory has increased but no one is complaining. New contracts have been concluded for creative cooperation between the scientists and the production enterprises. Cooperation between specialists in Armenia and Turkmenia has been fruitful. It culminated in the development of a lactic fermentation product, rich in vitamins, proteins and amino acids, similar to the traditional Turkmen "chal." But its basis is not camel's milk but cow's milk. The medicinal liquor has been named "Anait." Technology for its commercial production is being developed at the institute. Professor L. Yerzinkyan and Candidate of Biological Sciences L. Chayan recently returned from a trip to the Baltic. Together with associates from the Latvian Academy of Sciences Institute of Microbiology, the Riga Medical Institute, the collective of the republic pediatric clinical hospital and representatives of the public health organs, they had been making preparations for the startup of production of the "Narine" tonic. It will be used in pediatrics in the treatment of gastrointestinal and other diseases. Latvian and Armenian specialists are putting the final touches to a technology for processing green mass into high-calorie, vitamin-rich fodder. Technicians at the "Uzvara" kolkhoz now have patrons from Abovyan city, who together with the Riga people have formed a scientific team, helping to speed up the transfer of the fermentation vats to a more productive regime. Research conducted by the Armenian microbiologists to develop highly efficient lactic fermentation bacteria and make practical use of them has also been useful for Estonian specialists. [By S. Putnyn'] [Text] [Moscow PRAVDA in Russian 31 May 83 p 3] 9642

CSO: 1840/517

## FOOD TECHNOLOGY

### IMPROVED CANNING TECHNIQUE DISCUSSED

Moscow IZOBRETATEL' I RATSIONALIZATOR in Russian No 2, Feb 83 pp 20-21

[Article by A. Butovich, chief of the Patent and Information Division of the Simferopol Special Design Bureau for Food Machine Building: "Dealing with Crooked Jars--It Is Possible to Increase the Output of Canned Goods without Actually Increasing the Output"]

[Text] It is a shame when a food product makes the long and difficult journey from the field to the canning jar and then is lost at the final stage of preparation. But this does happen. And this is often due to the simple reason that the jars are fragile.

In order to seal a jar containing some food product, the jar is clamped between a supporting base and a cartridge so that it is held rigid and will not turn around its own axis as the lid is being attached with a hermetic instrument, and as it moves along on rollers. The jar is subjected to approximately 80 kg of force. This axial stress is acceptable for normal jars, as long as it is within the acceptable limits for their size and shape. Unfortunately, not all jars are normal. Furthermore, the State Committee for Standards permits differences between the end of the jar's mouth and the bottom of the jar ranging from 0.8 to 1.5 mm. But this discrepancy is almost twice that on a significant number of jars. Because of thermal deformation of the glass, wear and tear on the molding parts on the pressing and glass-blowing equipment, and many other reasons, it is difficult to eliminate these problems. The distorted mouth of the jar inevitably leads to a differential in the load, the stress is concentrated on one limited section, and the glass breaks. The glass fragments ruin the food.

If it is practically impossible to produce a jar with no flaws, something must be done with the sealing machinery operating agents. Ye. P. Avramenko and Ye. I. Kolesnik, designers from the Simferopol Special Design Bureau for Food Machinery Building; and F. G. Moldavskiy, chief of the packaging laboratory at the Ukrainian Canning Industry Scientific Research Institute, who were working together on this problem, were assigned the task of redesigning the supporting base on the sealing machine, so that it would adjust itself under jars with different flaws in their mouths. Some taking a strict view of this might say that this is not pedagogically correct--that the sins of those manufacturing the jars should not be covered up. But economics and pedagogical principles do not always coincide.

So, instead of the rigid base design, the surface of which was precisely parallel to the sealing cartridge, a hinged base was made which was set on a spherical support. Now a flaw in the end of the jar elicits an appropriate angular shift in the base and the jar is clamped in place along the entire perimeter of its bottom and mouth in the "base-cartridge" system. The force is distributed evenly and the jar stays in one piece. This is the origin of the invention of the lifting and moving base for feeding jars into the hermetic sealing system (patent no 721373).

Industrial testing of the sealing machines with the newly designed bases have confirmed the designers' hopes. The mechanical breakage of jars after this modernization is no higher than 0.1 percent (before the modernization it was twice that). It has been decided that from now on all sealing machines for glass jars will be manufactured with bases of the new design. But at canning plants, the older machines with rigid bases will still be used for a long time. What should be done with them? Should we reconcile ourselves to losing food products? There is a solution. The new base design is not complicated. It can be manufactured by each canning plant. The base can be easily installed on the old machines. This is just what many owners of the old sealing machines are doing. You should do this, too. The developer of the new design--the Simferopol Special Design Bureau for Food Machine Building--is ready to provide you with the plans and to offer technical assistance.

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CSO: 1840/471

UDC 612.015.31:[546.41+546.18]612.015.6:577.161.2]-06:  
[613.281+612.287]([47+57]-17)

CHARACTERISTICS OF CALCIUM-PHOSPHORUS METABOLISM AND VITAMIN D SUPPLY UNDER  
CONDITIONS PREVAILING IN EXTREME NORTH

Moscow VOPROSY PITANIYA in Russian No 1, Jan-Feb 83  
(manuscript received 25 May 82) pp 17-22

BLAZHEYEVICH, N. V., SPIRICHEV, V. B., PEREVERZEVA, O. G., TENDITNAYA, L. V.,  
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Problem Solving Laboratory of Archangelsk Medical Institute; All Union  
Scientific Research Center of the Protection of Mother and Child Health, USSR  
Ministry of Health, Moscow

[Abstract] Supply of calcium, phosphorus and Vitamin D was studied among  
school age children (3-17 years old) living in Nenets National Okrug during  
winter and late spring period and among adult population of this region.  
Controls were selected from the area of Moscow and Kazan. The study consisted  
of determination of blood serum levels of calcium, inorganic phosphorus and  
25-hydroxyvitamin D. All of these determinations were significantly lower in  
the population living in northern Nenets territory as compared to Moscow-based  
children. The 25-hydroxyvitamin D levels among the Nenets subjects were  
about 50% lower than those of the central region population. The reason for  
the mineral deficiency was related to a nutritional deficiency, while that of  
vitamin D was probably due to much shorter exposure to sunlight. Correctional  
measures for this situation were proposed. References 23: 13 Russian,  
10 Western.  
[495-7813]

UDC 616.153.455.627-053.2-085.874

FEASIBILITY STUDY OF MANUFACTURING LACTOSE-FREE PEDIATRIC AND DIETETIC  
FOOD PRODUCTS

Moscow VOPROSY PITANIYA in Russian No 1, Jan-Feb 83  
(manuscript received 5 Mar 82) pp 39-41

ANISIMOVA, G. A. and LINKE, O. E., Institute of Nutrition, USSR Academy of  
Medical Sciences, Moscow

[Abstract] An attempt was made to produce lactose-free milk-protein concentrate  
which could be used to feed children with impaired carbohydrate metabolism. A

procedure was described based on treatment of defatted, pasteurized milk with yeast  $\beta$ -galactosidase at pH 6.9 and 35°C for 6-7 hrs. After this, the milk was heated to 80-85°C for 5-7 min, cooled to 37°C and acidified with lactobacterium acidophilum. The final dry concentrate contained only 0.05% lactose, but now it also contained 0.1% galactose, making its use limited. Further work on production of lactose- and galactose-free concentrate was recommended. Figure 1; references 7: 1 Russian, 6 Western.  
[495-7813]

UDC 616-056.232-053.2:613.22

#### HYGIENIC REASONING FOR AND EFFECTIVENESS OF RATIONAL NUTRITION FOR CHILDREN WITH RETARDED GROWTH

Moscow VOPROSY PITANIYA in Russian No 1, Jan-Feb 83  
(manuscript received 20 Apr 82) pp 30-33

SMOLYAR, V. I. and CHEREDNIK, V. P., Kiev Scientific Research Institute of Nutrition Hygiene

[Abstract] The goal of this study was to evaluate hygienic reasoning of rational food regimens for children with retarded growth. A group of 65 11-year old children without any endocrinological or other chronic diseases was studied for a year. One half of them received a rationally-developed diet, the others were observed under their standard feeding habits. In this study group 58% of children exhibited growth retardation from their 2-4 year of age, and 21.5%--from the 5th year. More than 3/4 of them had poor appetite. Average daily energy expenditure was estimated at 2400 Kcal, ranging from 1776 to 2624 Kcal; this was about 460 Kcal below standard levels. However this difference was probably due to smaller body mass. Analysis of the diet showed that the consumed food was low in calories, deficient in vitamins, minerals and growth-stimulating substances. To counter this situation the experimental group was maintained on a special diet gradually enriched in all the deficient components. Their appetite was stimulated with T-ra Amaral, and utilization of food was improved by addition of enzymatic preparations. The results showed an average increase of 2.4 cm in height and 0.7 kg in weight of the subjects in the study group as compared to the controls. The overall health status improved: the study children exhibited better appetite, improved sleep, fewer headaches and less frequent dizziness spells. References 21: 19 Russian, 2 Western.  
[495-7813]

## TOXICITY OF MICROORGANISMS ISOLATED FROM DRY PEDIATRIC AND DIETETIC FOOD PRODUCTS

Moscow VOPROSY PITANIYA in Russian No 1, Jan-Feb 83  
(manuscript received 23 Jun 82) pp 59-61

KIRILENKO, O. A., PRAVNICHENKO, L. I. and FLUYER, F. S., Odessa Technical Institute of Food Industry imeni M. V. Lomonosov; VNIPKI [unknown abbreviation] "KONSERVOPROMKOMPLEKS", Odessa; Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] The goal of this project was to study contamination, with *Bac. cereus* cells and with staphylococci, of dry food products prepared for children's consumption. After storage under uncontrolled temperature and humidity conditions, the levels of these microorganisms were not at enterotoxic levels. However, the very presence of these agents showed that potentially they could lead to serious problems in situations of improper storage or inadequate thermal treatment. Therefore, it is necessary to strive continuously for improvement of industrial sanitary and hygienic conditions. References 13: 12 Russian, 1 Western.  
[495-7813]

UDC 614.31:658.387

## EXPERIENCE GAINED IN EFFORTS TO IMPROVE ON-GOING SANITATION INSPECTIONS OF PUBLIC FOOD HANDLING ESTABLISHMENTS

Moscow VOPROSY PITANIYA in Russian No 1, Jan-Feb 83  
(manuscript received 31 May 82) pp 74-77

ARTEMOV, A. A., VANKHANEN, V. V., GORSUNOVA, Ye. F., NERUSH, A. A., LISOVENKO, N. I., POPOVA, Zh. S., RAKHMETOVA, T. V., TOMASH, K. K. and UL'YANSKAYA, V. I., Chair of Nutritional Hygiene, Donetsk Medical Institute imeni M. Gor'ki; Division of Nutritional Hygiene at Municipal Sanepidstation, Donetsk

[Abstract] Public food-handling establishments are subject to intensive state-supervised inspections in the area of food hygiene. These establishments are unique in that they combine production and business functions with on-site preparation of the final product; the work load occurs in peaks and valleys, the starting material is extremely diverse, easily spoiled, and so are the final products. Therefore, it is extremely important to continuously improve sanitary control over these activities. One of the tasks would be to find the most crucial "hot spots" of possible problems. A series of tests was performed checking out the most frequent transgressions in terms of food-handling rules. They ranged from one to 90 violations per 100 observations; the transportation rules were broken most often, followed by unsanitary conditions of the equipment and the working sites, improper storage temperature, and poor personal hygiene. Actual food preparation and its storage were the two most important sources of possible bacterial contamination. References 6 (Russian)  
[495-7813]



#### BRIEF

IONOL AS FOOD PRESERVATIVE--Increasing the shelf life of articles produced by the food and cosmetics industries without changing their qualities is one of the avenues of scientific research being followed by associates at the Riga Polytechnical Institute Department of Technologies for Organic Synthesis. A method has been developed there to use ionol for this purpose, a nontoxic, highly efficient antioxidant. It slows down the process of oxidation during which the appearance of products changes and they lose their qualities. Its use at the Riga "Dzintars" Production Association has shown that the addition of ionol to cosmetic creams and powders [pomada] doubles or triples their shelf life. This substance has the same favorable effect on meat and fat. Together with scientists from the Latvian Scientific Research Institute of Animal Husbandry and Veterinary Science, associates from the department are conducting research on the use of ionol in feed concentrates and medicines for cattle. [By G. Proleyko] [Text] [Riga SOVETSKAYA LATVIYA in Russian 11 May 83 p 4] 9642

CSO: 1840/520

## GENETICS

### PROGRESS NOTED IN FIELDS OF GENETIC ENGINEERING AND BIOTECHNOLOGY

Moscow TRUD in Russian 17 May 83 p 3

[Article based on interview with A. A. Bayev: "Science Conducts a Search--Genetic Engineering"] [Passages enclosed in brackets printed in boldface]

[Text] During the last decade, biology has advanced to the front lines of science. Today, A. A. Bayev, academician and academician secretary of the Biochemistry, Biophysics, and Chemistry of Physiologically Active Compounds Department, USSR Academy of Sciences, Hero of Socialist Labor and the leading Soviet scientist in this field, speaks with our readers about the progress and the future of its development.

[Advances in the biological sciences compel us to speak of a real revolution in this discipline. What discoveries do you consider particularly important?]

I would choose the advances in discovering the laws of heredity. Geneticists have learned how to gain access to cellular and molecular processes and have established, conclusively enough, why and how, figuratively speaking, children look like their parents. Enriched by many developments, biology has come a long way from its beginning form. Its scope is no longer confined to its cognitive task--the study and description of the living world around us. Through the help of genetic engineering and gradually emerging biotechnology, biology is becoming an agent of change for this world, filling the needs of the people.

[You speak of the creative nature of modern biology, Aleksandr Aleksandrovich, as its distinguishing feature, but domestic animal and cultured plant species created hundreds of years ago were also created by man. What did genetic engineering bring to biology that is new?]

Yes, man has transformed living organisms from time immemorial. Species of domestic animals and cultured plants, however, were obtained by a long process of crossbreeding and selection. Man discovered these methods empirically and used them, not understanding their true essence. Everything changed when a scientist succeeded in uncovering the nature of the gene--the bearer of hereditary information. For centuries it had been something mystical, almost

non-existent, but it proved to be a completely real chemical structure--a definite segment of deoxyribonucleic acid (DNA), which shows up in the cell primarily by synthesis of a definite protein.

Also, the genetic code has been broken and the mechanism of genetic processes studied. We can now easily show that DNA reconstruction gives rise to changes in the hereditary properties of an organism, and they take place by means of biological catalysts--enzymes. Some break up the molecule and others join fibers together. Nowadays, scientists have learned how to separate these enzymes from the cells, to remove them. This was the real revolution--researchers got hold of the instruments that nature itself uses for DNA reconstruction. It then became possible to isolate the substance of heredity--the bearer of genetic information, and to go from this to the creation of predetermined altered organisms.

Thus, the era of genetic engineering in biology began just some 10 years ago. We will not go into detail--the process is too complex, but the essence of it is that for the first time an experimenter succeeded in combining genetic structures existing independently in nature into a whole. Their fusion was not the result of a chance molecular collision, but was the result of a conscious choice, a predetermined plan. A new living system emerges--a unique biological factory created by the hands of man. As a result of the combination, microorganisms with a changed type of metabolism were obtained, e.g., *E. coli* synthesizing the human hormone insulin. This hormone is not necessary to *E. coli* itself, and such forms do not exist in nature.

*E. coli*, containing working human genes--undoubtedly a new organism!

[And what is the practical application for genetics, and particularly genetic engineering?]

The use of human insulin obtained from bacteria containing human insulin genes, was discovered in the USA and Great Britain. The development of genetic engineering is progressing by principally the same methods as in other countries. They are working on methods for producing insulin, amino acids and enzymes. Next is interferon, a protein that defends the organism from viral infections.

Methods for producing growth hormone are also being developed. It prevents the development of dwarfism in children suffering from hereditary anomalies and will probably be used for treating fractures, burns and wounds. In general, medicine can expect a lot from genetics and genetic engineering in the fight against hereditary diseases. Galactosemia is an example of a congenital illness. An enzyme is not manufactured in the baby's body; without this enzyme the galactose which is a part of the milk sugar of breast milk is not assimilated. In our country, by using special tests, physicians have been able to discern galactosemia during the first days of a child's life and to successfully treat children with this and other hereditary illnesses.

At the present time gene therapy seems somewhat unlikely, but physicians and scientists are aware of hundreds of hereditary metabolic disorders. In the vast majority of cases it has been established precisely which gene is

damaged and what enzyme or hormone is not being manufactured in the required amount in the body. Genetic engineering practically makes it possible for any gene to be manufactured in the laboratory, and having obtained the gene, it can be used in principle to compensate for a hereditary defect.

[Incursion into the previously unknown domain of heredity is certainly fraught with scientific as well as social consequences. Doesn't genetic engineering harbor danger for man? What is the reason for the furor being raised by industrialists and activists of the West concerning this problem?]

Generally speaking, by themselves the scientific discoveries are neither good nor bad; they are not hiding any kind of threat to mankind and his future. The whole thing depends upon whose hands they fall into, and whose interests will be served by using the achievements of human genius. For example, take the defoliants synthesized by chemists. Using them causes artificial leaf drop, which, let us say, makes harvesting the cotton plant easier. The very same defoliants were used by American militarists to annihilate plant life and to poison huge areas in Vietnam. So where is the evil? In the creation of the agent or in its use by the aggressor? Geneticists will be able very soon to end up in the same position as the synthetic chemists, who long ago left behind the forms created by nature and created an enormous world of organic compounds--man's creations. It is not by chance that big business has become very interested in genetic engineering. A phenomenon has already developed in the pharmaceutical industry in western countries, which has received the brash name "The DNA Industry." Industrial magnates contribute millions to companies whose intent is to use industrial processes based on the technology of genetic engineering. Stock-jobbing reminiscent of the gold fever of Jack London's era reigns in businessmen's groups. And the furor developing around genetic engineering basically has no particular causes in and of itself--it is caused by the elementary foreboding of the impending industrial revolution, this time tied to biology.

[What are the characteristics of this new era? What is special about biological technology? What does it have to offer production today? Are there predictions for the near future?]

Biotechnology is a science of production, based on biological processes. These days it is aligned with two basic technologies of 20th century technology--mechanical and chemical technologies. Biotechnology is just beginning to develop and for now just a few biological processes are in use that can compete from an economics point of view with standard chemistry procedures. Other skeptics also maintain that expenditures for research for new methods are too high and therefore unjustifiable. But let us remember the example of Joule himself who, figuring out once that it was cheaper to feed a horse than to change zinc in an electrical battery, came to the conclusion that the horse would never be replaced by the electric motor...

Microbiology is the basic biotechnology of our day. Even many thousands of years ago, people used microorganisms, though unaware of their existence, for making bread, wine, beer and processing natural materials. And now microbiology processes are used extensively in the food industry. But our country's most important product is obtaining nutrient protein from yeast

cultivated in petroleum products. It is well-known that antibiotics are also obtained through biology, due to the vital activity of microorganisms. Genetic engineering methods are the natural way for entering into biotechnology.

A very promising trend in biotechnology is cellular engineering. Different kinds of vegetable cells, freed from solid walls, can fuse together and in this manner hybrid plants that never cross-pollinate in nature can be obtained. Plants have a wonderful property--to regenerate a developed organism from a cell--capable of growing, blooming, giving fruit, and most of all by cross-pollinating in the usual way. The propagation of plants in a culture, from cells, is characterized by enormous productivity, it takes up little space, is not dependent on drought and rain and, finally, it is possible year round. Unfortunately, at the present time it isn't working in all cases. But, by this year the Institute of Plant Physiology, USSR Academy of Sciences, had finished working out methods for propagating 20 types of flowers, grapes, potatoes, alfalfa, clover, rice, barley and several other plants in cell cultures. A promising potato hybrid was obtained, as well as hybrids of rice, barley and triticale (wheat and oats).

There are significant advantages to biological production. Lathes and reactors are not at work here--but bacterial, vegetable and living cells, their components, protein molecules and nucleic acids. The technological plans in this case must be more precise and economical, since even complex processes take place in a living cell extremely rapidly and completely. Synthesis can be achieved not in rapidly-depleting carbon and petroleum materials, but in practically unlimited natural renewable resources--cellular tissue in its different forms and wood. Finally, biological production wastes are organic in nature, are easy to process and for this reason will not pollute the environment.

12262

CSO: 1840/428

UDC 575.46

O-METHYLHYDROXYLAMINE--AN EFFECTIVE MUTAGEN OF PLASMID DNA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 6, Apr 83  
(manuscript received 23 Nov 82) pp 1496-1499

PREOBRAZHENSKAYA, Ye. S. and KRIVISKIY, A. S., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow  
(Presented by A. A. Bayev, academician, 16 Nov 82)

[Abstract] A study of induction of mutations in plasmid DNA under the effect of O-methylhydroxylamine (OMHA) showed that OMHA is a highly effective mutagen with regard to plasmid DNA. The capacity of OMHA to induce mutations not only during a high "survival rate" of the plasmid DNA but also during practically complete absence of lethal effect of the reagent makes OMHA an exceptional mutagen. This uniqueness may, apparently, be explained either by assuming that N<sup>4</sup>-methoxy-6-methoxyamino-5,6-dihydrocytosine, which is a "lethal" product of OMHA and DNA interaction, undergoes effective reparation or that it may also, somehow, be mutagenic. Figures 4; references 9: 5 Russian, 4 Western.  
[464-2791]

UDC 577.3+53(086.5)+576.312.31.1

BIOPHYSICAL MODELS OF SELF-ORGANIZATION OF THE SPATIAL STRUCTURE OF CHROMATIN

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 6, Apr 83  
(manuscript received 7 Sep 82) pp 1500-1502

ANDREYEV, S. G. and SPITKOVSKIY, D. M., Moscow Physical Engineering Institute; Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow  
(Presented by academician N. M. Emanuel 16 Aug 82)

[Abstract] The simplest models of chromatin condensation were constructed and specific features of them were explained with consideration of a fibrilla with fixed "primary" structure and a fibrilla with a changing "primary" structure. There were found physical regularities of spatial self-organization of polymer fibrillae with changing "primary" structure suggesting the important role of the structure in the functioning of chromatin and the possible mechanisms of regulation of the activity of genes by means of

reconstructing the spatial structure of chromatin. Study of the changing "primary" structure showed the existence of supermolecular states inaccessible for systems with fixed "primary" structure. Cooperative transitions between these states correspond to structural rearrangements in the chromatin with formation of condensed and uncondensed glomerate zones and give off different gene sequences, specific for the conditions of transition. The glomerate zones are subject to factors leading to its further activation. Figures 2; references 5: 1 Russian, 4 Western.  
[464-2791]

UDC 577.1:547.963.3

CLONING AND RESTRICTION ANALYSIS OF HEPATITIS B VIRUS, DNA SEQUENCES,  
INTEGRATED INTO THE GENE OF PLC/PRF/5 LINE CELLS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 6, Apr 83  
(manuscript received 16 Dec 82) pp 1508-1509

RIVKINA, M. B., NARODITSKIY, B. S., KUKAYN, R. A., academician LiSSR Academy of Sciences and TIKHONENKO, T. I., Institute of Microbiology imeni A. Kirkhenshteyn, LaSSR Academy of Sciences, Riga; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Partial hydrolysis of DNA of PLC/PRF/5 line cells by specific endonuclease of EcoRI was performed and DNA fractions with mean molecular mass of  $9 \cdot 10^6$  daltons were selected and cloned in Charon 4A (Ch4A), producing  $10^6$  recombinant clones; the initial Ch4A background after testing on a medium containing X-gal (5-bromo-4-chloro-3-indolyl-beta-D-galactoside) was less than 10 percent. DNA clones which, according to hybridization data, contained DNA of hepatitis B virus (HBV) were analyzed by blotting hybridization. Analysis of one of these clones showed that D-EcoRI-fragments of Ch4A and HC9 differ in molecular mass showing the presence of an intercalary of cellular DNA in clone HC9. Blotting-hybridization of BamHI-fragments of HC9 revealed DNA HBV in the fragment with molecular mass of  $13 \cdot 10^6$  daltons. A fragment with such a molecular mass could be formed only as a result of the sum of the remaining section of the BamHI-A-fragment of DNA of Ch4A and the section of cellular DNA adjacent to it. This confirmed the presence and the location in the genome of the hybrid phage HC9 of EcoRI, the fragment of cellular DNA carrying DNA HBV sequences. Three phage clones, carrying intercalaries of DNA HBV were revealed by the methods described above. Figures 3: references 14: 2 Russian, 12 Western.  
[464-2791]

ISOLATION OF CHOLINESTERASE FROM SPIDER (*LATRODECTUS TREDECIMGUTTATUS*) VENOM AND STUDY OF SOME OF ITS PROPERTIES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 6, Apr 83  
(manuscript received 7 Dec 82) pp 1510-1513

CHERNETSKAYA, I. I. and SADYKOV, A. S., academician, Institute of Bioorganic Chemistry, UzSSR Academy of Sciences, Tashkent

[Abstract] A study of cholinesterase activity in some arthropod venoms included isolation and purification of *L. tredecimguttatus* venom, which displayed the highest cholinesterase activity of all species studied. Fractionation of *L. tredecimguttatus* venom on Sephadex G-50 in 0.005 M ammonium-acetate buffer, pH 7.8 separated the venom into three fractions ( $US_1$ ,  $US_2$ ,  $US_3$  in order of their yield). Determination of cholinesterase activity by the Ellman method revealed hyaluronidase, cholinesterase and kininase activity only in fraction  $US_1$ . Chromatographic study of fraction  $US_1$  on DEAE cellulose revealed six fractions ( $US_{1D_1}$ - $US_{1D_6}$  in order of their yield). Cholinesterase activity was seen only in fraction  $US_{1D_2}$ . A study of the substrate specificity showed that the cholinesterase uniformly hydrolyzed acetylthiocholine bromide, acetylthiocholine iodide and acetylthiocholine chloride but did not affect butyrylthiocholine iodide or propionylthiocholine iodide substrate. An excess of substrate inhibited the cholinesterase action of the venom. Figures 2; references 5: 4 Russian, 1 Western.  
[464-2791]

UDC: 575.24:576.85

## STUDY OF PLASMID OMICRON DNA REPLICATOR IN SACCHAROMYCETE YEASTS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 5, Apr 83  
(manuscript received 10 Nov 82) pp 1240-1244

LARIONOV, V. L., KUPRINA, N. Yu., AVER'YANOV, A. V. and KARPOVA, T. S., All-Union Scientific Research Institute of Very Pure Biological Preparations, Leningrad; Leningrad State University imeni A. A. Zhdanov

[Abstract] Omicron DNA or 2  $\mu$ m DNA is a multiple-copy critical plasmid participating in most laboratory and natural strains of yeast saccharomycetes. The effect of rep genes can be tested by their behavior in the hybrid plasmid cells containing o-DNA. In this work we attempted to determine whether the function of rep o-DNA genes would appear in the case when the o-DNA replicator was combined with centromeric locus of CEN3, providing strict single-copy maintenance of hybrid plasmids containing the chromosomal replicators ARS1, ARS2 and ARS of the ribosomal DNA of yeast. The mitotic stability of centromeric Yep-CEN3 plasmids was found to be identical in all analyzed



strains, i.e., independent of the presence of o-DNA in the cell and rep genes bonded with it. A similar work on the behavior of hybrid plasmid containing replicator o-DNA and centromeric CEN<sup>4</sup> locus in cir<sup>+</sup> and cir<sup>0</sup> strains of yeast was recently conducted by other authors who reported that the mitotic stability of the centromeric plasmids with o-DNA replicator in the cir<sup>+</sup> strain was approximately four times greater than in the cir<sup>0</sup> strain not containing o-DNA. This apparently explains the divergence between the data of the present authors and the results of previous authors on determination of the mitotic stability of centromeric plasmids with o-DNA replicator in the cir<sup>0</sup> and cir<sup>+</sup> yeast strains. References 11: 2 Russian, 9 Western.  
[481-6508]

UDC: 575.24:576.858.9

#### MUTAGENESIS WITH o-METHYLHYDROXYLAMINE ON ISOLATED PLASMIDS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 5, Apr 83  
(manuscript received 1 Nov 82) pp 1210-1212

BRESLER, S. Ye., MACHKOVSKIY, V. V., TAMM, S. E. and PERUMOV, D. A.,  
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[Abstract] A study was made of o-methylhydroxylamine (OMHA), which specifically modifies cytosine and induces premutation changes in the base. This was demonstrated for mutagenesis in vitro on transformed *Bacillus subtilis* DNA, where the yield of mutants defective in tryptophan synthesis was several tens of percent with slight inactivation resulting primarily, not from o-methylhydroxylamine, but rather from the influence of pH and reaction temperature. It was found that the plasmids, while preserving the capability to transform the HB101 cells to ampicillin-resistant cells, remained genetically inactive. At pH 6.0, all processes were greatly retarded as a result of the decrease in the rate of modification of cytosine with increasing pH. Treatment of separated plasmids with OMHA at 50°C and pH 4.5 or 6.0 was thus found to be a very effective and simple method of inducing premutation changes, converted to hereditary mutations during the course of replication of modified plasmids in the recipient cell. Figure 1; references 9: 5 Russian, 4 Western.  
[481-6508]

## SPECTROPHOTOMETRIC STUDY OF PLASMID DNA

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian No 10, Oct 82  
(manuscript received 14 May 82) pp 790-795

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[Abstract] A study was made of differential melting curves to describe RP4 plasmid DNA and its derivatives with divisions and insertions. The work involved the study of the following plasmids: RP4 (bla, tet, kan, tra<sup>+</sup>), RP4::Tn3 (bla, tet, kan, tra<sup>-</sup>), pAS9 (bla, tet, tra<sup>-</sup>). The plasmid DNA was separated from bacterial lysates (E. coli, J53 pro<sup>-</sup> met<sup>-</sup>). The RP4 plasmid DNA was treated to open the restrictase EcoRI superspirals in a buffer of 100 mM tris-HCl, pH 7.5, 5 mM MgCl<sub>2</sub>, 50 mM NaCl at 37°C for one hour. After three times phenol deproteinization and final DNA purification it was transferred to 0.1 X SSC on a column with G-50 fine sefadex. It was found that these experiments could yield information on the nature of the nucleotide sequence of the insert or deletion in the DNA. Figures 4; references 24: 6 Russian, 18 Western.  
[487-6508]

UDC: 576.312.32.578.086

MOLECULAR-CYTOLOGIC ORGANIZATION OF THE BALBIANI 1 (KBs) RING OF  
CHIRONOMUS THUMMI

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 4, Apr 83  
(manuscript received 31 Aug 82) pp 951-954

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[Abstract] In this work a combination of methods was used to study balbiani rings in Ch. thummi: morphologic analysis of the structure of the rings in various tissues, in various stages of development of larvae, with inhibition of transcription activity of the rings of actinomycin B (at 1 and 10 µg/ml, 6 hours) and galactose (1% solution, 7 to 30 days); the extension of the rings by unfixed isolated chromosomes by factors of 70 to 100 to complete removal of higher levels of packing; hybridization in situ of <sup>125</sup>I-75S RNA in preparations with pressed and stretched chromosomes. The length of DNA coding 75 S RNA participating in the formation of the rings in Ch. thummi was found to be quite great, similar to the length of KB2 DNA of Ch. tentans (about 160 µm). The results of the study indicate a number of basic conclusions which may be significant in the creation of ring organization models: 1) the DNA sector forming the ring is quite long; 2) all ring DNA can participate in transcription; 3) all of this DNA apparently codes 75 S RNA of the ring. Figures 2; references 15: 4 Russian, 11 Western.  
[484-6508]

MAPPING OF SECTORS OF DNA SPLITTING OF THE PHAGE T<sub>4</sub> OF EcoRV ENDONUCLEASE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 269, No 4, Apr 83  
(manuscript received 23 Feb 83) pp 995-999

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[Abstract] The bacteriophage T<sub>4</sub> is a classical object of molecular genetics and biology. A method of molecular cloning has allowed significant expansion of the study of replication, transcription, recombination, reparation and morphogenesis. The T<sub>4</sub> bacteriophage and its DNA are objects which allow a study of these processes both in vivo and in vitro, primarily due to the presence of a broad collection of various mutants. Specific fragmentation of T<sub>4</sub> phage DNA was performed by two means, search for possible removal of modification from the R<sub>4</sub> phage DNA and specific fragmentation of T-even phage DNA in the search for restriction endonuclease capable of hydrolyzing T-even phage DNA with various degrees of modification. This work presents data on mapping of sites of splitting of T<sub>4</sub> phage DNA restrictase. Strains of E. coli were used. Figure 1; references 15: 7 Russian, 8 Western.  
[484-6508]

HUMAN FACTORS.

UDC 331.015.11:621.382:539.4.015.1

ENGINEERING PSYCHOLOGY IN MICROELECTRONICS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 5, May 83 pp 39-41

ISAYEV, Yu. V., General Director of NPO "Elektronpribor", candidate of technical sciences, and BASHAYEVA, T. V.

[Abstract] Introduction of microelectronics has led to new demands placed on workers: higher responsibility in their jobs and higher emotional stress. The human factor plays a decisive role in determining quality of production, but operators need professional preparation and their working conditions must be adjusted to create a harmonious relationship between the worker and his environment. The following recommendations were made for the optimization of performance during the working day: development of alternating periods of optimal work and rests; organizing proper rest during these breaks so that the eyes and the back could recover from strain, design of the work benches and of the surroundings to permit lowest level of exhaustion. In general, engineering and psychological studies of the performance of operators could help in designing measures facilitating adaptability of humans to their working environment and pointing out factors which could lead to improved performance of the operators. Figures 2; references 3 (Russian).

[497-7813]

USE OF YTTERBIUM-ERBIUM LASER IN CLINICAL OPHTHALMOLOGY

Moscow VESTNIK OFTAL'MOLOGII in Russian No 1, Jan-Feb 83 pp 3-6

[Article by Professor V. V. Volkov, Hero of Socialist Labor and Honored Scientist of the RSFSR; Yu. D. Berezin, candidate of biological sciences; Yu. P. Gudakovskiy, candidate of medical sciences; P. S. Avdeyev, engineer; A. F. Gatsu, physician; and N. I. Plotnikov, physician; of the Ophthalmology Department (Professor V. V. Volkov, director), Military Medical Academy imeni S. M. Kirov, Leningrad]

[Text] The ytterbium-erbium laser ophthalmo-coagulator was created in 1978 through the joint efforts of associates of the State Optics Institute imeni S. I. Vavilov and the Ophthalmology Department of the Military Medical Academy imeni S. M. Kirov (P. S. Avdeyev and coauthors, 1978, 1980). The authors immediately made suggestions for its future use in treating diseases of the eyelids and the aqueous chamber of the eye. The suggestions were based on the fact that 94 percent of the incident energy of the infrared radiation of this laser with a wave length of 1.54 microns is absorbed by the cornea and aqueous humor of the anterior chamber, and by other integumentary tissues (P. S. Avdeyev and coauthors, 1978, 1981; Yu. D. Berezin, 1980).

The present paper summarizes the results of the experience that has been accumulated in the application of the ytterbium-erbium laser for various diseases of the eye, in order to clarify indications for its use in clinical ophthalmology.

Research methods and materials. An ytterbium-erbium laser coagulator with radiation in the infrared spectrum with a wave length of 1.54 microns of free generation was used for laser coagulation. The energy output of the radiation in the plane of the affected object ranged from 0.5 to 1.0 J. Changeable positive lenses from 4.0 to 8.0 dptr made it possible to create on the object a radiation spot 0.5 to 3 mm in diameter. This in turn made it possible to obtain the necessary energy density and to apply intense doses to surface tissues of the eye (the cornea, conjunctiva) and the skin. The diameter of the irradiation spot and the energy exposure were determined by proceeding from the clinical peculiarities of each patient's disease. It was taken into account that the radiation energy of the given laser is almost completely absorbed in tissue thickness up to 1 mm. There were 12 to 50 laser applications per session; the number of sessions ranged from 2 to 4, depending on the type of

disease, the size of the affected area, and the dynamics of the pathological process in the course of treatment.

The laser treatments were applied in all the cases under local anesthetic in the anterior chamber of the eye ball and on the conjunctiva after 2-3 applications of drops of a 0.25 percent dicaine solution; and on the skin and edges of the eyelids after infiltration anesthetic with a 0.5 percent novocaine solution (0.5-1.0 ml).

The infrared laser ray was applied using a helium-neon laser under the control of a "ShchL-56" fissure lamp, with 18-18-fold microscopic amplification. The degree of coagulation in the tissue was determined by the appearance of a grey and white area in the tissue.

There were 99 patients (109 eyes) under observation, with different diseases of the eyelid and eye (see the table). Many of them were treated as outpatients.

With vascularized opaque areas of the cornea, the arteries of the limbus were coagulated. They were identified as follows: for superficial arrangement, identification was made biomicroscopically according to the direction of blood flow; for deep structures, determination was according to the nature of the branching (the arteries are smaller in diameter and their course follows a straight line). In complicated cases, data from fluorescent angiography of corneal vessels was used. With marked vascularization of the cornea, and the goal of presurgical preparation for keratoplasty, the coagulates were applied to the limbus in a solid "chain", to decrease blood flow during the operation, and to avert or reduce possible subsequent vascularization of the transplanted tissue.

With superficial forms of herpetic keratitis, coagulates were applied so as to include the epithelia of the injured areas; with corneal ulcers, they were applied so as to include the bottom and edges of the cornea. With stromal forms, coagulation of all injured layers of stroma was achieved by increasing the energy density.

Laser applications for patients with limited endothelial-epithelial dystrophy (EED) of the cornea were made only in the areas of paracentrally and peripherally distributed dystrophic sites, using "through" coagulates from the epithelium to the endothelium. The optical zone was left intact.

In cases with a pterigium, its neck was coagulated and attempts were made to form thrombi in the vessels supplying it in the paralimbal area in the sclera.

A progressive nevus of the conjunctiva, abnormally enlarged epibulbar vessels, and sites of blood effusion under the conjunctiva were subjected to coagulation along all their surfaces.

Laser applications were made in the same way for small cysts and papillomas on the edge of the eyelid. Laser therapy was also applied to subconjunctival chalazia in the initial stage of their development (3 x 3 x 3 mm in size).

The coagulate was localized in the area of the eyelash bulb in cases of trichiasis.

**Results and Discussion.** With vascularized cataracts of the cornea of varying optical density and origin (caused by burns, herpes, trauma, etc.), coagulation of arterioles led to stasis of blood in those vessels with subsequent obliteration and emptying of the venous bed, usually after a single application. In all cases the full effect was obtained (blood flow in the coagulated vessels ceased). Incidents of rechanneling of the vessels were not observed. During the course of keratoplasty operations on patients whose corneal vessels received preventive laser coagulation, there were no cases of blood flow observed.

Clinical observations of patients with various forms of herpetic keratitis (10 people) showed that the ytterbium-erbium laser can be used effectively to treat this disease. It is true that during the first 6-12 hours following the laser coagulation, almost all the patients (8 people) experienced increased tearing, light sensitivity, and pain in the irradiated eye; in 2 patients these phenomena gradually subsided, but lasted 3-5 days. On eyes with superficial and stromal keratitis, epithelialization of the cornea appeared 4-6 days after the laser application. In 2 cases of herpetic sores of the cornea that were not deep, there was persistent flow of coagulated tissue as it slowly tore away after laser irradiation, as was the case with other superficial keratitis. Over the course of 8-12 days, the process ended with the formation of a delicate scar. With deep stromal keratitis (2 patients), the corneal opacities in the coagulation sites were more intensive, since the doses of irradiation were higher than those for superficial keratitis.

A decrease in stromal edema was noted in patients with limited EED 3-4 days after ytterbium-erbium laser coagulation in the irradiated areas. The blister-like changes in the corneal epithelium disappeared even more quickly, the pain syndrome decreased or disappeared, and the transparency of the cornea increased. This can be explained by the infiltration of the stroma that occurred as a result of the laser irradiation, and the cessation of the leaking of aqueous humor from the anterior chamber into the stroma through part of the injured endothelium. This last fact in the special experiments was confirmed by histological studies (Yu. D. Berezin, 1980). In two cases visual acuity increased from 0.02 to 0.2.

In 1 of the 7 patients (with total EED), no effect was observed. There was concern about increasing the stromal opacities through the action of the laser on the optical zone, so additional treatments were not applied.

Among the 13 patients being treated for pterigium, immediately after coagulation and in the subsequent days, there was a noticeable decrease in color in the head and body of the pterigium, and a decrease in its vascularization. No progression of the pterigium was noted over the course of 1.5 to 2 years of subsequent observation of the patients.

With progressive nevi of the conjunctiva of the eyeball, in 2 of the 4 cases laser irradiation led to complete disappearance of the nevus; in the other 2

cases, there was a decrease in size and in the intensity of its pigmentation. Moderate vascularization appeared in the affected areas.

In 2 patients with lymphomas of the conjunctiva, laser therapy resulted in the complete involution of the lymphomas with the formation of a hardly noticeable scar. Coagulation of abnormally expanded conjunctival vessels (teleangiectasis) resulted in their emptying and scarring. In a patient with subconjunctival blood effusion in both eyes that did not resolve for a long period (up to 6 months), irradiation of these areas led to complete resolution of the blood in 24 hours.

Laser coagulation of small cysts and papillomas in the area of eye adnexae made it possible to eliminate them without any recurrences over the course of a year from the time of observation, with the formation of an insignificant, delicate scar.

In three cases the cyst and papilloma had localized directly on the inferior tear duct. Surgical removal of the formations carried the danger of damaging the tear ducts and subsequent tearing. Use of the laser (under microscopic control) provided safe removal of these formations.

Coagulation of bulbs of eyelashes growing improperly in the presence of trichiasis had only a partial effect: in a number of cases the eyelashes grew out again. When the chalazion or conjunctival xanthoma were irradiated, no positive effect was obtained.

Conclusions. 1. Infrared irradiation of the ytterbium-erbium laser, installed in a fissure lamp, can be used successfully to eliminate pathological vascularization of the cornea, teleangiectasis of the conjunctiva, and persistent subconjunctival blood effusions.

2. Irradiation with this laser is effective in the treatment not only of superficial, but stromal and ulcerous forms of herpetic keratitis. There is no need to use dyes or any other screening devices in order to achieve the coagulation effect here.

3. The thickening effect of the ytterbium-erbium laser irradiation on loose, edematous tissue of the cornea can be used in the treatment of endothelial-epithelial dystrophy of this structure; this is effective with partially damaged corneas (not including the optical zone).

4. Ytterbium-erbium laser irradiation has a superficial destructive effect on biological tissue, which can be used successfully in the removal of small cysts and papillomas; the possibility of removing pterigium in this manner requires further study; the effect on bulbs of eyelashes that are growing improperly is not lasting.



Distribution of patients treated with ytterbium-erbium laser according to nosological forms

Part of the eye affected	Disease	Number of patients (eyes)	Effect (No of eyes)		
			Complete	Partial	None
Anterior chamber of eyeball	Vascularized cataract, cornea	28(29)	29	--	--
	Herpetic keratitis:				
	Superficial forms	6(6)	6	--	--
	Stromal forms	2(2)	2	--	--
	Ulcerous	2(2)	2	--	--
	EED	7(7)	2	4	1
	Pterigium	13(15)	15	--	--
	Progressive nevus of the conjunctiva	4(4)	2	2	--
	Lymphoma of the conjunctiva	2(2)	2	--	--
	Xanthoma of the conjunctiva	1(1)	--	--	1
	Anomalous expansion of conjunctival vessels	1(2)	2	--	--
	Persistent subconjunctival blood effusion	1(2)	2	--	--
Eyelids (skin and edge)	Cysts	9(10)	10	--	--
	Papillomas	9(9)	9	--	--
	Chalazion	7(9)	--	--	9
	Trichiasis	7(9)	--	4	5
Total		99(109)	83	10	16

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## LASERS USED IN TREATMENT OF BURNS

Moscow MOSKOVSKAYA PRAVDA in Russian 14 Jun 83 p 3

[Article by S. Mindelevich, TEKHNIKA I NAUKA correspondent: "On the Offensive against Disease--The Laser Treats Burns"]

[Text] Optic quantum generators--lasers--cut steel plates, drill holes in diamond, weld parts, and heat-treat them.... And all this creates the feeling of such strength, such power, that you would not at all want to accidentally get into the path of the laser beam. Let alone deliberately. Meanwhile, the "laser knife" is now being used even in operations. And in the Department of Severe Heat Injuries of the Scientific Research Institute of First Aid imeni N. V. Sklifosovskiy, I saw a small, 3-mm-diameter, violet-laser light spot moving about a burned place on the hand of a patient. I wanted to know how the patient felt during this.

"Why don't you try it yourself?" suggested the department head, Candidate of Medical Sciences L. I. Gerasimova.

I admit, it was not without caution, gently, prepared to jerk back my hand, that I placed my palm under the beam. I didn't feel a thing!

"In laser series LGI-21, which we are using, the power of the pulse is fairly high--3 kilowatts," explained Candidate of Physical-Mathematical Sciences I. Z. Nemtsev.

"But the pulses themselves are very short--billionths of a second. So the temperature in the region of irradiation doesn't rise even half a degree, and the patients don't feel a thing. There aren't even any scars..."

The physicians in the Scientific Research Institute, which Muscovites call simply the Sklifosovskiy Institute, meet up with many real life tragedies. It is here that Red Cross trucks bring the most seriously ill patients. In a year, some hundreds of patients come through the burn department. The circumstances vary greatly. There are burns from flames, boiling water, steam, chemical agents, electrical burns...

Until recently, in cases of bad burns, some victims died or became invalids. Recently, however, many new methods of treatment have appeared which give excellent results, methods which use not only medicine, but also hormone

preparations, vitamins, transfusion of blood or its fractions (plasma, erythrocytes, serum) and blood substitutes, and also surgical intervention. In this latter case, intact skin from the patient's leg or thigh is transplanted to the burned place. But sometimes no methods succeed in giving a full recovery--the transplanted skin would detach in some places. Even repeat operations did not help. And many years after being discharged from the hospital, patients have still needed outpatient treatment.

But several years ago, I. Z. Nemtsev, a graduate of the Moscow Physical-Technical Institute, came to work at the Sklifosovskiy Institute... Even during his student years, he was interested in lasers, he devoted his dissertation to them. Igor' Zinov'yevich then went on to use lasers for treating burns. Before this, the lasers used in medicine were mainly carbonic-acid or helium-neon lasers. They were the first to be used by surgeons instead of scalpels for bloodless operations (the ray comes through a flexible and thin light guide and not only cuts the tissue, but also "welds together" the severed blood vessels); for "welding on" a detached retina; and for burning away festering and gangrenous tissues. Radiation with helium-neon lasers helped in joining bone fragments, treating diseases of the joints (both traumatic and from old age) and certain skin disorders (trophic ulcers, eczema)... But burn victims were not significantly helped by helium-neon lasers.

Then I. Z. Nemtsev suggested using a nitrogen ultraviolet (UV) generator. The idea got support from L. I. Gerasimova. Thus began the scientific "duet" of physicist and physician.

After thorough, comprehensive testing on animals, it was decided to use the new method in the clinic in the Sklifosovskiy Institute. And patients began to recover! Even patients whose wounds had not healed for months! Just half a year later, having discharged the first 50 irradiated patients from the clinic, the scientists realized that their hopes had been fully warranted.

As insurance, they initially took on only patients for whom no other methods had been successful for 2-3 months. And after just 10-15 radiation sessions, their wounds began to heal.

The laser procedures were demonstrated for me. I assumed the patient would be placed in front of the apparatus and the "barrel" carefully aimed... It was nothing like that! A small cart was wheeled into an ordinary hospital ward. On the cart was a box about the size of an average television--the power source. On the cover was a half-meter-long metal case with a small window, resembling a tube--the radiating part of the instrument.

"Let's start with you," the physician said to one woman. She sat on her bed and uncovered the burned place on her hand... "The cart will have to be moved," I thought, "the patient is to the side of it." And again I was wrong. Dr. M. V. Shakhlamov got out a small round mirror and, holding it in his hands, reflected the beam directly onto the wound. Then, by moving the mirror, he began to move the violet light spot, visible to the eye, about the surface of the burn. This treatment takes from 30 seconds to 3 minutes,

depending on the size of the wound, they told me. Usually, 5-10 sessions are required--one per day. Only one precaution needs to be taken during this procedure--the patient is asked to turn to the side so that the beam does not accidentally get in his eyes.

Since 1979, this method has cured more than 220 patients, ranging in age from 19 to 89, with burns of various degrees of severity and on practically every part of the body. The first patients are periodically re-examined--no negative effects have been detected.

In the burn department, laser procedures have now become the usual method of treatment. It is a recognized invention and L. Gerasimova and I. Nemtsev received author's certificates for it.

And do you want to know the success rate of this treatment? It is 100 percent! Now all patients leave the institute with healed wounds. Obviously, the treatment has to be brought into wider use.

12255

CSO: 1840/544

## FUNCTIONAL STATUS OF STOMACH AFTER LASER SCALPEL RESECTION

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 11, Nov 83 pp 23-26

BASHILOV, V. P., MAMENOVA, T. K. and KIRSHNER, Yu. F., Central Scientific Research Laboratory (headed by O. K. Skobelkin), 4th Main Administration USSR Ministry of Health

[Abstract] The most important causes of post-resectional stomach disorders are thought to be disorders of the reservoir function of the stomach and poor emptying. Attempting to prevent functional disorders after gastric resection for gastric ulcer or cancer, the authors have developed a laser scalpel gastric resectioning procedure, featuring precision technique and a narrow gastrointestinal anastomosis 2-2.5 cm in diameter, formed with a single row of sutures. The small intestine is not cut longitudinally, but rather transversely along the antimesenteric edge. This anastomosis prevents sudden evacuation of the stomach and reflux of its contents, which may lead to atrophic processes, even cancer. The authors observed 189 patients following laser distal gastric resections, including 66 operations performed by the new method. Some patients were examined radiologically and endoscopically. Evacuation disorders in the early postoperative period were found to be related to disorders of gastric motor function. Precision laser techniques allow the formation of the narrow gastrointestinal anastomosis 2-2.5 cm in diameter. This anastomosis does not disrupt evacuation in the short-term postoperative period and prevents reflux of the intestinal contents in the long-term period. References 12: 11 Russian, 1 Western.

[527-6508]

UDC: 599.537. *Orcinus* sp. n.(269.7)

NEW SPECIES OF KILLER WHALE (CETACEA, DELPHINIDAE) IN ANTARCTIC WATERS

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 62, No 2, Feb 83 (manuscript received 7 Sep 81) pp 287-295

[Article by A. A. Berzin and V. L. Vladimirov, Pacific Scientific Research Institute of Fisheries and Oceanography (Vladivostok)]

[Text] A new killer whale species, *Orcinus glacialis* sp. n. from high latitudes of the Indian Ocean sector of Antarctica (Prydz Bay, Sea of Cooperation) is described. A morphological and bio-ecological comparison is made of the new species to the *O. orca*, that is close to it, from Antarctic waters. The independence of the *O. glacialis* species is validated by its considerable differences from *O. orca* with regard to the main morphological and physiological parameters, as well as various biological and ecological aspects.

Since the first description of the killer whale by K. Linnaeus in 1758 and up to recent times, researchers had at their disposal only isolated specimens of killer whales, which had been caught by chance or were beached, in most regions of the world oceans. The very marked sexual dimorphism, age-related and individual variability, as well as cosmopolitan distribution led to descriptions of many genera and species of killer whales\* which, however, were deemed invalid as time passed. In recent years, the systematics of killer whales were not questioned, and all researchers recognized that there was one species, *O. orca* (Tomilin, 1957, 1962; Hershkovitz, 1966, and others) in the genus *Orcinus* Fitzinger, 1860.

In all the time that whaling was practiced in Antarctica, killer whales were caught by chance. The deliberate hunting for killer whales by the Soviet Union in these waters during the 1979-1980 season enabled the scientific group of the "Soviet Russia" Antarctic Whaling Fleet (AKF), which recovered 906 head of these cetaceans,\*\* to gather material that was unique in scope. During

\*These descriptions could not include high latitudes of Antarctica.

\*\*Hunting for killer whales in all regions of the world oceans was not regulated by the rules of the International Whaling Convention

the whaling period, attention was immediately drawn to the appreciably smaller killer whales (686 of them were caught), whose bodies were completely covered with a film of diatomic algae, for which reason they were called "yellow," in contrast to the common "white" killer whale (hereafter, we shall sometimes use these names). These killer whales fed exclusively on fish and kept to large groups in the small floes.

Processing of extensive material and the necessary morphological and bio-ecological comparative analysis, which was performed in the Laboratory for the Study of Cetaceans of the Pacific Ocean Institute of Fisheries and Oceanography (TINRO), enable us to maintain that there are two species of killer whales of the genus *Orcinus* that inhabit Antarctic waters. This fact had already been noted in a previously published article of ours (Berzin, Vladimirov, 1982), but heretofore there had been no published description of the new species conforming to the requirements of the International Code for Zoological Nomenclatures.

The authors express their appreciation to V. N. Kolesnikov and V. A. Talyzin for help in gathering the material, and to A. A. Kuz'min, A. Ye. Kuzin and M. K. Maminov, who are on the staff of the Laboratory for the Study of Marine Mammals, TINRO, for help in processing the data and preparing this article.

*Orcinus glacialis* Berzin et Vladimirov, sp. n.

**Material.** The holotype is a 580-cm male. Its age is over 19 years,\* the fluke span is 171 cm, height of dorsal fin is 99 cm, width of pectoral fin is 69 cm and length from forking of the tail to the umbilicus is 364 cm. It was caught in Prydz Bay, Sea of Cooperation, Indian Ocean Sector of Antarctica, on 18 March 1980. The skull is kept at the TINRO Museum, No 4. Paratypes are 2 males and 3 females caught in the same region, at the same time and they are in the same museum under Nos 5-9.

**Comparative description.** According to our measurements of killer whales in Antarctica, both male and female *O. glacialis* are generally smaller than *O. orca*. In a sample consisting of 220 "white" killer whales (100 females and 120 males) and 686 "yellow" ones (358 females and 328 males), the males of the former species were 112 cm larger and females 64 cm larger than the latter species.

Figure 1 illustrates the sizes of killer whales caught by the "Soviet Russia" AKF in Antarctica in 1980 (before the ban on catching them).

Comparative morphometry revealed that there was a significant and reliable difference in virtually all of the major measurements (Tables 1 and 2; Figure 2) and in area of flukes of adult specimens of the same size: it was 40% smaller in *O. glacialis* than in the ordinary killer whale (Figure 3A), although when the sizes were the same, the latter were much younger than specimens of the new species described.

\*Age was determined according to dentin layers on longitudinal tooth section [cut], assuming that one broad light layer is formed per year.

Table 1. Body measurements of *O. glacialis* caught in Antarctica

Measurements	Males						Females					
	absolute size, m			indexes, %			absolute size, m			indexes, m		
	n	M	m	lim	M	m	lim	n	M	m	lim	m
1. ZOOLOGICAL LENGTH	3	5,80	0,16	5,70—6,10	—	—	—	3	5,20	0,12	—	—
2. END OF SNOUT TO CENTER OF BLOWHOLE	3	0,61	0,05	0,55—0,67	10,50	0,65	9,48—11,05	3	0,59	0,03	11,33	0,82
3. END OF SNOUT TO ANGLE OF MOUTH	3	0,39	0,01	0,38—0,40	6,64	0,12	6,55—6,84	3	0,38	0,02	7,35	0,65
4. END OF SNOUT TO CENTER OF EYE	3	0,44	0,01	0,42—0,46	7,49	0,19	7,24—7,71	3	0,43	0,02	8,23	0,45
5. END OF MANDIBLE TO ANGLE OF MOUTH	3	0,36	0,01	0,35—0,38	6,18	0,03	6,14—6,22	3	0,36	0,01	6,91	0,60
6. CENTER OF EYE TO CENTER OF EAR	3	0,24	0,01	0,23—0,25	4,09	0,25	3,77—4,38	3	0,22	0,01	4,23	0,09
7. WIDTH OF PECTORAL LIMB	3	0,70	0,01	0,69—0,72	11,93	0,08	11,80—12,00	3	0,42	0,01	8,10	0,11
8. HEIGHT OF DORSAL FIN	3	1,01	0,05	0,95—1,09	17,19	0,50	16,66—17,86	3	0,47	0,02	8,93	0,61
9. LENGTH OF BASE OF DORSAL FIN	3	0,73	0,02	0,70—0,75	12,50	0,45	12,06—13,15	3	0,44	0,01	8,47	0,22
10. FORK OF TAIL TO FIN	3	3,18	0,11	3,03—3,30	54,25	0,99	53,15—55,51	3	2,81	0,03	53,50	1,19
11. LENGTH OF FLUKE (LEFT)	3	0,83	0,05	0,76—0,88	14,25	0,77	13,33—15,17	3	0,57	0,01	10,85	0,37
12. WIDTH OF FLUKE (LEFT)	3	0,43	0,01	0,42—0,46	7,38	0,12	7,24—7,54	3	0,34	0,01	6,51	0,21
13. FLUKE SPREAD	3	1,66	0,09	1,53—1,76	28,39	1,10	26,84—29,48	3	1,42	0,04	21,33	0,74
14. HEIGHT OF TAIL STALK	3	0,40	0,01	0,38—0,42	6,81	0,19	6,55—7,01	3	0,33	0,02	6,32	0,30
15. FORK OF TAIL TO UMBILICUS	3	3,59	0,03	3,55—3,64	61,24	1,93	58,19—62,80	3	3,32	0,08	63,09	2,78
16. FORK OF TAIL TO ANUS	3	1,98	0,01	1,97—2,00	33,82	0,81	32,78—34,73	3	1,76	0,03	33,43	1,11
17. FORK OF TAIL TO GENITAL ORIFICE	3	2,66	0,03	2,63—2,72	45,39	1,58	43,11—46,89	3	1,90	0,05	36,22	1,57



Table 2. Body measurements of *O. orca* caught in Antarctica

Measure- ments*	Males						Females					
	absolute size, m			indexes, %			absolute size, m			indexes, %		
	n	M	±m	lim	M	±m	lim	n	M	±m	lim	lim
1	9	7,55	0,09	7,10-7,90	10,84	0,30	9,84-12,37	12	6,41	0,16	5,20-7,00	—
2	9	0,81	0,02	0,72-0,90	7,48	0,13	7,03-8,15	12	0,72	0,02	0,54-0,85	8,81-13,34
3	9	0,56	0,01	0,52-0,63	8,13	0,17	7,29-8,78	12	0,52	0,02	0,42-0,63	6,48-10,32
4	9	0,61	0,01	0,54-0,67	6,68	0,14	6,05-7,26	11	0,59	0,02	0,49-0,72	7,80-10,95
5	9	0,50	0,01	0,44-0,56	4,13	0,11	3,77-4,71	11	0,48	0,02	0,37-0,59	6,34-9,78
6	9	0,31	0,01	0,27-0,36	12,97	0,30	11,82-14,34	11	0,30	0,01	0,25-0,42	4,16-5,51
7	9	0,97	0,02	0,87-1,05	11,83	0,25	10,98-12,90	9	0,55	0,01	0,48-0,62	7,53-9,58
8	8	1,40	0,03	1,29-1,52	48,60	0,53	16,76-20,75	9	0,69	0,02	0,60-0,78	9,44-11,57
9	8	0,89	0,02	0,81-1,01	11,83	0,25	10,98-12,90	9	0,66	0,03	0,54-0,84	8,21-12,04
10	7	3,87	0,12	3,35-4,26	51,41	0,90	48,64-54,61	8	3,44	0,14	3,08-4,11	49,33-55,76
11	9	1,25	0,02	1,18-1,37	16,64	0,40	15,30-18,66	11	0,83	0,01	0,79-0,88	11,94-13,81
12	9	0,63	0,03	0,55-0,82	8,27	0,33	7,65-10,47	11	0,48	0,01	0,41-0,55	6,67-8,32
13	9	2,51	0,03	2,36-2,74	33,40	0,52	31,14-35,51	9	1,67	0,02	1,60-1,83	24,64-28,41
14	9	0,54	0,02	0,43-0,65	7,18	0,25	6,10-8,22	10	0,42	0,02	0,33-0,52	5,56-8,13
15	9	4,67	0,10	4,20-5,10	62,31	0,80	59,25-65,93	10	3,84	0,10	3,53-4,47	55,47-63,90
16	9	2,52	0,06	2,26-2,80	33,52	0,48	31,54-35,57	11	2,11	0,07	1,88-2,63	30,20-33,63
17	9	3,34	0,11	2,92-3,89	43,87	0,61	41,11-46,20	11	2,30	0,08	2,02-2,88	32,02-36,91

\*Numbered parts of the body are identified in Table 1.

Table 3. Skull measurements of killer whales caught in Antarctic waters (adult specimens)

Measurements	<i>O. glacialis</i>										<i>O. orca</i>									
	males					females					males					females				
	abs. size, cm			Index		abs. size, cm			Index		abs. size, cm			Index		abs. size, cm			Index	
	n	M	lim	%		n	M	lim	%		n	M	lim	%		n	M	lim	%	
CONDYLOBASILAR LENGTH	4	82,6	81,0—84,1	100,0		5	81,8	78,7—85,2	100,0		2	113,3	108,8—118,7	100,0		2	91,6	81,9—101,3	100,0	
ZYGOMATIC WIDTH	4	54,8	52,5—56,4	66,3		5	54,9	53,6—56,5	67,1		2	80,7	74,2—87,2	71,2		2	58,3	52,8—63,9	63,6	
INTERORBITAL WIDTH	4	46,1	44,2—48,0	55,8		5	45,8	45,5—46,9	56,3		2	67,6	63,2—73,0	59,6		2	52,3	52,0—52,7	57,0	
CONDYLAR WIDTH	4	17,2	16,4—18,5	20,8		5	17,3	15,8—19,5	21,1		2	22,1	22,0—22,3	19,5		2	18,7	17,0—20,4	20,4	
ROSTRUM LENGTH	4	39,4	38,3—40,2	47,7		5	38,5	36,4—40,0	47,0		2	64,4	60,5—62,3	54,1		2	43,4	36,8—50,0	47,3	
ROSTRUM WIDTH	4	27,6	26,5—29,3	33,4		5	27,7	27,3—28,5	34,1		2	39,8	37,0—42,7	35,1		2	28,6	27,2—30,0	31,2	
MAXIMUM LENGTH OF MANDIBLE (RIGHT)	4	67,3	65,3—68,4	81,4		5	66,8	65,4—68,9	82,4		2	95,4	91,6—99,3	84,2		1	82,6	—	90,1	
HEIGHT OF MANDIBLE AT BASE (RIGHT)	4	19,7	19,1—20,3	23,8		5	20,5	19,3—21,8	25,0		2	29,3	28,1—30,5	25,8		1	22,0	—	24,0	
HEIGHT OF MANDIBLE AT END OF TOOTH ROW (RIGHT)	4	9,6	9,4—9,8	11,6		5	10,0	9,5—11,0	12,2		2	15,8	14,8—16,8	13,9		1	13,0	—	14,1	
LENGTH OF TOOTH ROW IN MAXILLA (RIGHT)	4	32,1	31,4—33,2	38,8		5	31,4	30,3—33,6	38,3		2	47,2	46,0—48,5	41,6		2	35,2	31,5—39,0	38,4	
LENGTH OF TOOTH ROW IN MANDIBLE (RIGHT)	4	29,3	28,5—30,0	35,4		5	28,7	27,1—30,5	35,0		2	42,5	41,6—43,5	37,5		—	—	—	—	

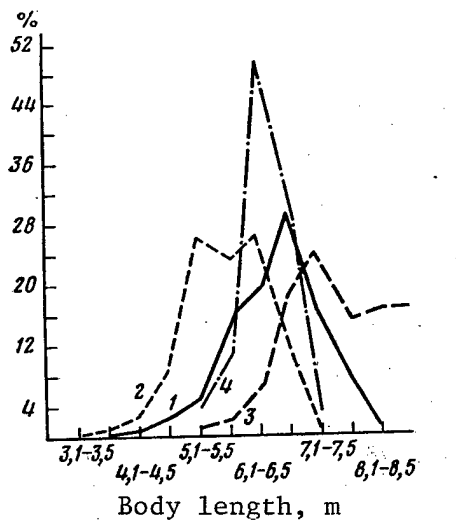


Figure 1.

Size distribution of killer whales caught in Antarctica in 1980 by the "Soviet Russia" AKF

- 1) *Orcinus glacialis*, males
- 2) Same, females
- 3) *O. orca*, males
- 4) Same, females

11.4% in the "white" whales and 19.6% in the "yellow" ones; the distance between the notch of the pterygoid bones to condyles was 32.0 and 37.6%, respectively; from the top edge of the occipital foramen to the occipital crest--26.5 and 31.5%; distance between condyles--10.5 and 14.5%.

While there is very limited mobility of the head of most cetacean species and, in particular, killer whales, the scalar difference is, in our opinion, the position of the skull of these killer whales in relation to the body axis (axis of the cervical spine), as illustrated in Figure 3B, b. A difference is also observed in shape of the temporal fossa and in area of attachment of muscles to it (Figure 3C).

Such distinct differences were not demonstrable in measurements and construction of the skull of females of the two killer whale species, but the relative length of the mandible and its row of teeth was appreciably smaller in *O. glacialis* females.

A comparison of killer whale teeth revealed, in 100% of the cases, a significant difference in size of all teeth, which was striking in males, for both the upper and lower jaw. Thus, a tooth from the middle of the row (i.e., one of the largest) was almost half the height and width after growth was complete and weighed one-fourth of the weight of a tooth in a male *O. orca* from Antarctic waters, before growth had been completed (Figure 3D).

In *Orcinus glacialis*, the dental pulp cavities close considerably earlier than in the "white" whales: on the average at about 20-22 years of age in the

The results of skull measurements on killer whales from Antarctic waters (Table 3) revealed that the relative width of the skull is considerably larger in male *O. orca* than in males of the new species. The indexes of zygomatic and interorbital width are larger in "white" whale males than in "yellow" ones. "White" males also have a relatively more elongated rostrum (Figure 3B, a).

Additional skull measurements revealed that the width of the rostrum in the middle is 7.1% greater in "white" males (32.0 and 24.9%), while the distance between the external margins of the intermaxillary bones near the tip of the rostrum is relatively twice as long (8.8 and 4.2%) than in "yellow" males.

In the cerebral region, differences were found between males in the following measurements: length from posterior edge of vomer to condyles constituted

former and 33-35 years in the latter. The maximum age that we determined from teeth was 21 years for *O. glacialis* and 30 years for *O. orca* in Antarctic waters, in which the tooth had not yet stopped growing. Thus, it can be concluded that "white" killer whales of the same age as "yellow" ones are physiologically considerably younger. This can also be seen from the presence of nonfused bones in *O. orca*: maxilla with the frontal bones, pterygoid with the palatine, maxillary with the palatine, supraoccipital with parietal, whereas in *O. glacialis*, which was younger, all sutures referable to the above-mentioned bones were obliterated.

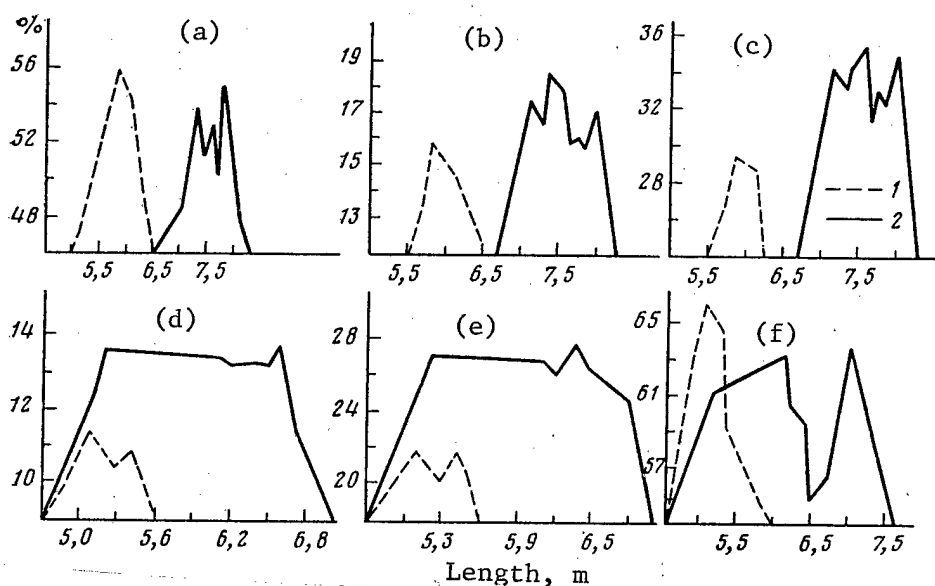


Figure 2. Body proportions of killer whales in Antarctica

- |                        |                      |
|------------------------|----------------------|
| 1) <i>O. glacialis</i> | c, e) measurement 13 |
| 2) <i>O. orca</i>      | f) measurement 15    |
| a) measurement 10      | a-c) males           |
| b, d) measurement 11   | d-f) females         |

The depth of the alveoli at the end of the row of teeth in the maxilla is about the same as in the middle in *O. orca* males; the interalveolar septa are well-marked. In male *O. glacialis*, depth of alveoli at the end and beginning of the row of teeth is one-third less than in the middle. Inter-alveolar septa are well-marked only in the first six alveoli; closer to the base of the rostrum these septa are wanting, which could be indicative of reduction of the tooth system in *O. glacialis*.

Coloration of these killer whales is generally similar; however, the preliminary results of analysis of discrete coloration features (according to Evans, Yablokov, 1978) of the two killer whale species shows that there is a statistical difference between them with regard to incidence of variants of configuration of the suborbital and brachial notch, and general shape of the genital field.

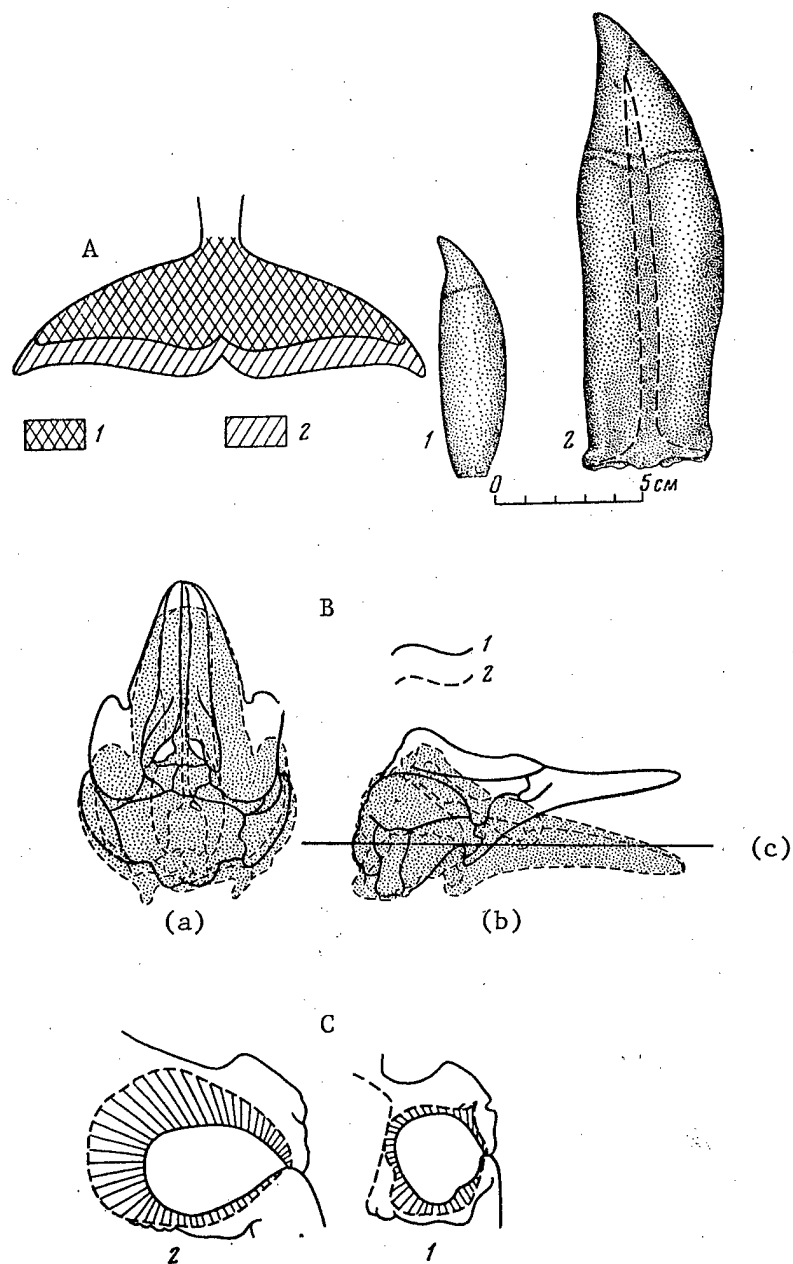


Figure 3. Comparative area of flukes (A), skull configuration, drawing made from photographs (B; a--top view superimposed over zygoma in width; b--lateral view; c--axis of cervical region), shape of temporal fossa, the area of muscle attachment (C) is cross-hatched, comparative measurements of killer whale teeth in Antarctica

1) *O. glacialis*

2) *O. orca*

Physiological status. The smallest adult *O. glacialis* female was 3.8 m in size and *O. orca* was 5.7 m; however, onset of puberty was noted when the former reached a size (average) of 4.8-5.0 m and the latter 5.8-5.9 m. When

the "yellow" killer whales we examined measured (average) 4.6-4.9 m, 77% had already had offspring, and some of them had done so more than once. Of the "white" females 5.7-5.9 m in length, 60% were still impuberal (Figure 4). Of the *O. orca* females we caught, 26.6% were pregnant and this applied to 45.0% of the *O. glacialis*; barren ones constituted 45.1 and 29.1%, respectively. With the same number of traces of corpora lutea of pregnancy and ovulation, the *O. glacialis* were shorter on the average (up to 1-m difference) than *O. orca*; the average quantity of such traces was found to be virtually the same in females of different species: 5.4 in *O. orca* and 5.98 in *O. glacialis*.

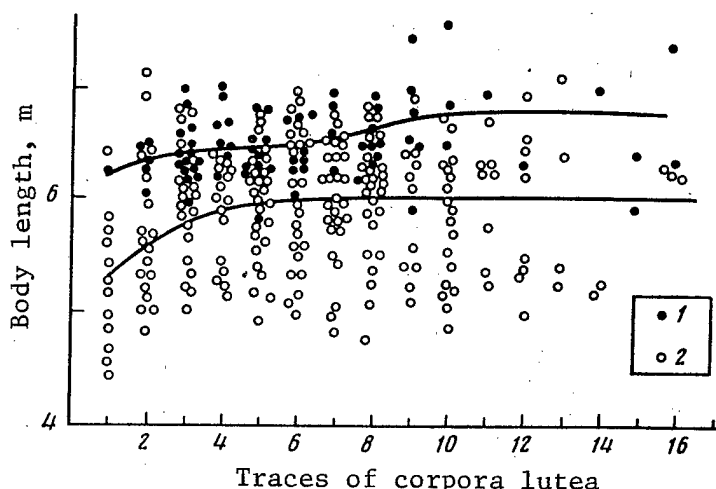


Figure 4. Size of female whales with the same number of traces of corpora lutea: 1--*O. orca*, 2--*O. glacialis*

**Distribution. Ecology.** The "Soviet Russia" AKF whalers encountered *O. glacialis* from 60° to 141° 40' east longitude at different latitudes, depending on the position of ice edge. No doubt, the range of this species is broader, perhaps even circumpolar.

The habitat of both species of *Orcinus* is often in the same vicinity; however we did not encounter mixed groups with both species together. "Yellow" whales stay by the ice edge and among sparse ice floes; the "white" ones prefer clear water.

As a rule, the *O. orca* groups consist of 10-15 specimens and are 8-10 miles apart in Antarctica; *O. glacialis* form groups of up to 150-200, and the distance between groups can be considerably smaller.

Examination of 785 stomachs, consisting of 156 from "white" and 629 from "yellow" whales, revealed that there was a basic difference in nutrition of these species in Antarctica (% incidence): *O. orca* 3.2--fish, 89.7--marine mammals, 7.1--squid; *O. glacialis*--98.5, 0.4 and 1.1, respectively).

**Discussion.** The morphological distinctions between species of the genus *Orcinus*--in skull proportions, tooth size and fluke area--can be well explained

by the basic difference in mode and objects of nutrition for these whales; the "white" killer whales feed on large marine animals and the "yellow" ones on virtually exclusively fish. Thus, the new *Orcinus* species is an ichthyophage.

The above-mentioned morphophysiological differences between whales of the genus *Orcinus*, in the absence of any visible isolating barriers and with habitats that are close to one another, can be interpreted as proof of genetic isolation. Still not quite clear is the question of the boundaries of the range of *O. glacialis* and its relationship to that of *O. orca*; it should be answered by future studies.

The very possibility of describing a new species of large mammal, and quite numerous at that, could prompt doubt at the present time, if we did not take into consideration the very special circumstances that developed during the period of termination of pelagic whaling in Antarctica. Even a very limited quantity of any cetacean species, including *Orcinus*, can be caught in the open sea only from whaling fleet vessels; for this year, in all years that whaling was practiced in Antarctica, *Orcinus* were caught very seldom, by chance, along with large cetacean species that remained outside the floes. Evidently, the few *Orcinus* that were caught by whalers of all countries over many years could have been *O. orca*. The "yellow" whale could have been sighted and almost certainly was sighted (but that's all!) from vessels sailing for other purposes (expeditions, ice-breakers, etc.). Whalers virtually never hunted for whales in the floes where this species stays. Only the deliberate mass-scale hunt for killer whales in Antarctica in 1980, first for *O. orca* and then *O. glacialis*, made it possible to conduct extensive comparative studies and single out the new species in the genus *Orcinus*.

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CSO: 1840/540

BLOOD CIRCULATION AFTER BLOOD SUBSTITUTE INFUSION

Moscow KARDIOLOGY in Russian Vol 22, No 9, Sep 82  
(manuscript received 18 Jun 81) pp 89-92

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[Abstract] Nine dogs (weight 10-15 kg, age 4-6 years) were maintained for 16-20 days without infusion of any preparation and their background levels for indices of hemodynamics were assayed. The dogs were then administered intravenous drip infusions (65-85 drops per minute) of low-molecular polyvinol (10 and 5 ml/kg), physiological salt solution (10 and 5 ml/kg) and erigem (5 ml/kg). The dogs tolerated the infusions well. Hemodynamic indices were then measured after infusion of the blood substitutes. Erythrocyte precipitation rate increased after all infusions: up to 20 mm/hour after erigem infusion, up to 10-15 mm/hour after polyvinol infusion and up to 10 mm/hour after salt solution infusion. Circulatory changes were a function of both the volume of solution injected and the nature of the preparation. Hemodynamic indices changed little after 5 ml/kg infusions of polyvinol and salt solution but changed considerably after 5 ml/erigem and 10 ml/kg of polyvinol. Infusion of 10 ml/kg of salt solution produced an increase of the systolic volume and minute volume of the heart, an increase in the pulse rate and a decrease in arterial pressure and specific peripheral resistance. Erigem produced a longer hemodynamic effect after a smaller dose than polyvinol (5 ml/kg of erigem in comparison with 10 ml/kg of polyvinol). The hemodynamic effect of the infusions was attributed to reflex excitation of the sympatho-adrenal system which increases renin secretion and heightens its activity in the blood. The experimental findings indicate that proper amounts of erigem and polyvinol may be quite useful in treating hemorrhage, shock and other pathological processes. References 13: 11 Russian, 2 Western.  
[523-2791



## MICROBIOLOGY

### ACTIVITIES OF THE INSTITUTE OF MICROBIOLOGY AND VIROLOGY OF THE UKRAINIAN SSR ACADEMY OF SCIENCES

Kiev VISNYK AKADEMII NAUK UKRAYNS'KOYI RSR in Ukrainian No 3, Mar 83 pp 8-10

[Abstract] Research and administrative activities at the Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, for the period covering 1979-1982 constituted the theme under discussion at the Presidium of the Ukrainian Academy of Sciences. The report was presented by Academician V. I. Skok, Secretary of the Department of Biochemistry, Physiology and Theoretical Medicine at the Academy. Skok covered the extensive studies being conducted on the identification, classification, and biochemical characterization of new microorganisms, evaluation of their metabolic products, and potential application in biotechnology, as well as other areas of medical microbiology, ultrastructural research, and industrial microbiology which have been the forte of the Institute for several decades. In the period covered, the work of the Institute has been reflected in 18 monographs, 612 articles in scientific journals, and 17 Author' Certificates. The current staff of the Institute consists of 517 individuals, of whom 15 hold the doctorate degree and 133 the Candidate of Sciences degree. Among the shortcomings needing improvement were the postgraduate training program which appears to be too long, unsatisfactory transfer of new technology to industry, and the rather weak programs in molecular biology and genetic engineering which could be strengthened by acquisition of new equipment and instrumentation for radioisotope work.

[504-12172]

UDC: 629.125.5

INFLATABLE LIFE RAFTS--RELIABLE MEANS FOR SAVING LIVES IN MARINE EMERGENCIES

Moscow RYBNOYE KHOZYAYSTVO in Russian No 2, Feb 83 pp 51-52

MALAKSIANOV, M. N., Captain of Long-Distance Navigation, Zapgosrybflotin-spektsiya [not identified; possibly Western State Fishing Fleet Inspectorate]

[Abstract] The author cites a previous article reporting a long-term drift experiment in an inflatable life raft conducted in the Black Sea under conditions intended to simulate those of an actual marine emergency. The experiment was necessary because many sailors did not previously have confidence in the PSN-10 inflatable life raft involved. PSN type life rafts have saved over 350 men in emergency situations in the fishing fleet over the past 10 years. Experienced sailors have stated that traditional life boats would not have saved nearly so many lives under the same conditions. Citing his personal experience in the Pavlin Vinogradov tragedy, the author reports that when the ship sank, both life boats were launched, but one was capsized and broken up by a wave, leaving one life boat and three inflatable rafts in the ocean in force 6 to 7 winds, wave action 5 to 6 units, air temperature 5 to 7°C, mixed rain and snow. The men from the life rafts were taken onboard the life boat along with the provisions from the life rafts. An attempt was made to sail the boat toward the Aleutians, but the mast broke. Oil was spread on the water and a sea anchor was trailed in an attempt to keep the boat bow to the wind. The sea anchor was lost, the wind picked up to force 9 or 10, visibility 0. On the 6th day after the sinking of the ship, the 9 remaining survivors were picked up by the Soviet steamship Ola. Twenty men had died in the life boat, mostly during the 4th and subsequent days due to cold and exposure. The author calls for detailed reports of all such accidents, particularly experiences in which shipwreck survivors have utilized type PSN inflatables. Instructions are outlined for measures to be taken in PSNs.

[528-6508]

UDC: 577.153.4:661.718.1:599:595.2

EFFECT OF CERTAIN THIOBUTINYL SUBSTITUTED PHOSPHORUS THIOACID ESTERS AND THEIR SATURATED ANALOGS ON CHOLINESTERASE OF VARIOUS ORIGINS

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 18, No 4, Jul-Aug 82 (manuscript received 28 Sep 81) pp 325-329

BALASHOVA, Ye. K., BRESTKIN, A. P., VIKHREVA, L. A., GODOVIKOV, N. N., KABACHNIK, M. I., PUDOVA, T. A., ROZENGART, V. I. and SHERETOBITOV, O. Ye., Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad; Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] Study was made of the effect of organophosphorus inhibitors, containing a butinyl group in the separated portion, and of their saturated analogs, on cholinesterase in various types of mammals and arthropods. The interactions of the compounds with acetylcholinesterase in human erythrocytes, mouse brain acetylcholinesterase, butyrylcholinesterase from horse blood serum, house fly acetylcholinesterase, aphid cholinesterase and spider mite cholinesterase was studied. Cholinesterase activity was determined by the method of Ellman, using acetylthiocholine or propionylthiocholine as the substrate at a concentration of  $1 \cdot 10^{-3}$  M at  $30^{\circ}\text{C}$ . Tables present data on the inhibiting activity of thiophosphonates on cholinesterase of various origins. The introduction of the acetylene bond to the molecule in all cases leads to an increase in anticholinesterase activity. The degree of the acetylene effect depends to a great extent on the nature of the enzyme and structure of the inhibitor. Two factors can explain the acetylene effect: 1) the acetylene bond increases the phosphorylating capacity of the compound, and 2) the acetylene bond, having significant  $\pi$ -electron density, can in itself interact with polar groups on the active surface of the enzyme. References 4: 3 Russian, 1 Western.  
[483-6508]

## PUBLIC HEALTH

### SERIOUS PROBLEMS CONCERNING RURAL HEALTH CARE CITED

Moscow IZVESTIYA in Russian 24 May 83 p 2

[Article by V. Sisnev, deputy chief of the Department of Science, Culture and Health of the Committee of People's Control, USSR and V. Petrynek, sector chief: "The 'Emergency Service' Is in No Hurry: Why Is It hard To See a Physician in Certain Non-Chernozem Oblasts?"]

[Text] Not long ago, workers from the committee of People's Control of the USSR and of the RSFSR, together with a large group of specialists, conducted an investigation in a number of oblasts in the Nonchernozem zone of the Russian Federation, to see how the requirements of the CPSU Central Committee May (1982) Plenum on improving rural medical care were being met. The purpose was to see how equalization of the level of urban and rural medical care is being accomplished.

Much has been done. A substantial amount of work has been done to improve the actual facilities for health care. The number of hospitals, outpatient clinics [ambulatoriya] and feldsher-midwife points have increased in rural areas from one year to the next. Therapeutic institutions are permanently staffed with medical teams and outfitted with modern equipment and apparatus. All of this promotes improvement in medical service for the rural population. Nonetheless, the investigation showed that the required level of medical care is far from being found everywhere.

This is what investigating deputy for the Pechengskiy Rayon Council, Murmansk Oblast, N. Ya. Hegushkina said. A medical outpatient clinic, with an internist, stomatologist, feldsher, registered nurse and laboratory technician has been in operation in the Rayakoska settlement for more than 20 years. The clinic served residents of this settlement and of surrounding villages as well. Now, only a feldsher remains on its staff. As a result, many inhabitants cannot get medical care on the spot and have to go 100 kilometers to the rayon center.

Several measures were taken this year to organize the operating system of therapeutic institutions, including rural ones, but this reconstruction exists only on paper in a number of places. Even Comrade N. T. Trubilin, Minister of Health, RSFSR who was in Kalinin Oblast not long ago was convinced of this.

A visit to the physician for an examination or to receive treatment requires expending a large amount of work time. Even the feldsher-midwife points have not reorganized their work everywhere; their hours for seeing patients are most often during the day and the points are closed as a rule on vacation days and holidays. One fifth of the pharmacists in Chelyabinsk Oblast do not usually work on Saturday.

Shortcomings in rendering medical care to rural inhabitants at home were reported. The overwhelming majority of house calls are done by feldshers. Few laboratory tests or electrocardiograms are done at home.

Emergency medical care for the rural population was badly organized in the Nonchernozem oblasts studied. Delays in leaving for patient calls were a widespread occurrence. Work schedules for the "emergency" team [skoraya pomoshch] are made up without considering the population's needs for this type of help. This leads to wasted time for the team during the nighttime hours and to increased delays during peak hour calls.

Moreover, the investigation proved that emergency help often is not even available to residents of outlying villages; patients have to get to the rayon hospitals by means of available transportation. Here is a specific example. In January of this year, N. Bondarev, a worker at a livestock farm living in the village of Bogomolovka, Glazynovskiy Rayon, Orel Oblast, had a heart attack. The emergency service refused to come out from the rayon center and relatives didn't get him admitted to the uchastok hospital until late at night. Similar situations have been reported in Vologda and Pskov Oblasts.

At the same time, "emergency service" vehicles are often used for purposes other than their primary designation. Thus, last year in Belozerskaya Rayon Hospital, Vologda Oblast, these special vehicles were used to transport hospital workers, food products and various "housekeeping" loads.

It is well-known that an important trend in the activity of outpatient clinic and polyclinic institutions is prophylactic work--periodic, purposeful exams, preventive dispensary observation, therapeutic-restorative measures. It is, namely, here that the reserves of efficient use of the bed supply are available. As shown by the investigation, however, prophylactic examinations are not always done in depth on rural inhabitants; this means that they are not provided with full coverage. A number of additions were discovered in statistical data, and in several Komi ASSR rayons coverage of sovkhos workers by periodic medical examinations was 10-12 times higher than it should have been.

The available bed supply is misused in hospitals. In Vladimir and Pskov Oblasts, bed days lost in 1982 due to construction period delays equalled a year of lost time for 2 hospitals with 400 beds each and medical treatment without additional expenditures for 14000 patients.

The lack of highly skilled staff has a negative effect on the sophistication and quality of medical care. The high turnover of medical personnel is due in large part to lack of the necessary concern for improving work and living

conditions. In the last 5 years 736 physicians have been sent to rural rayons of Pskov Oblast and 652 have left. Whereas, in the cities, there are 51 physicians for every 10000 people, there are 4 in the country. What is strange is that in the resolution adopted a month ago by the Pskov obispolkom, not a word was said about reinforcing the medical personnel in the country.

Instances of a wasteful attitude toward the use of medical technology were revealed. Thus, in Murmansk Oblast medical equipment and various apparatus worth 640,000 rubles are not being used.

Serious problems in the prescription of drugs to the rural population were uncovered. Only irresponsibility can explain denying drugs to patients--drugs that have been produced domestically in sufficient supply and that are available at pharmaceutical warehouses. Rural dwellers have to go dozens of kilometers to find nitroglycerin, eyedrops, mustard plasters, pipets and other widely used medical products.

Serious errors in the planning and distribution of drugs are tolerated by the Main Pharmaceutical Administration of the RSFSR Ministry of Health. As a result, in some oblasts a surplus of drugs exists, in others there are not enough. A large number of pharmaceutical compounds are written off. The reason for this is poor control of their usage and improper storage.

The profession of physician is treated with great respect in our country. This is not just noble work, however, but extremely responsible work. This makes it all the more intolerable when certain physicians break production or executive discipline, and when they sometimes show a callous attitude toward their patients. Last year in Pskov Oblast, 167 physicians and other medical workers received disciplinary penalties for breaches of production discipline.

Findings of the investigation of medical service to the rural population were considered by the Orlov and Pskov obispolkoms and the Vologda and the Murmansk oblast and Komi ASSR republic Committees of People's Control. For tolerating serious shortcomings in work a severe reprimand was levied on Deputy Minister of the Komi ASSR, Comrade A. D. Tyurin; Comrade V. M. Podol'skiy, chief of the Vologod oblzdravotdel [oblast health department] was reprimanded and subjected to a monetary fine. Included in the responsibility were many managers of therapeutic and pharmacy installations, workers at local health units and Medtekhnika workers.

Results of the investigation were discussed at the meeting of the USSR Committee of People's Control. A resolution was adopted concerning bolstering the leadership of the Main Administration of Pharmaceutical and Prophylactic Care, RSFSR Ministry of Health.

The chief of the Main Pharmaceutical Administration at the Ministry, Comrade A. N. Apazov, was severely reprimanded for serious shortcomings in obtaining prescriptions for the rural population, for gross errors in the planning and distribution of drugs, resulting in an artificial deficit and waste. Comrade A. K. Goryaynov, deputy chief of this central board was also severely punished.

The committee took into consideration the claim of Comrade N. T. Trubilin, RSFSR Minister of Health, that the ministry is implementing necessary measures to eliminate the shortcomings pointed out in the investigation regarding medical care for the rural population; and to improve the style and methods of operation of the ministry apparatus.

12262

CSO: 1840/424

## THREAT OF POLIO DISCUSSED

Tallinn RAHVA HAAL in Estonian 30 Mar 83 p 3

[Text] Is there concern about poliomyelitis infection? An ETA [Estonian Telegraph Agency] correspondent put this question to Oku Tamm, deputy ESSR Minister of Health and chief ESSR public health officer.

"The main prophylactic measure in the fight against infectious diseases is an active vaccination program. This has helped us to limit epidemic spread of many formerly-dangerous infectious diseases. Thanks to the massive use of anti-polio vaccines the frequency of this disease has been sharply reduced. In countries where systematic vaccination is taking place there have for many years been no cases of polio. Very remarkable results in the prophylaxis of poliomyelitis have been achieved especially in the USSR. The ESSR was one of the first Soviet republics in which the planned struggle against the dreaded disease began in 1957. Thanks to the broad immunization of the population, not a single polio case has been reported in our republic from 1962 onward. But, in spite of this, vigilance against the disease must not be relaxed, since poliomyelitis viruses are widespread.

"In many countries this serious disease is no rarity. Isolated cases have also occurred in some regions of the USSR. For this reason we are carrying out a systematic vaccination of children and adolescents, beginning with the third month after birth and continuing to age 16.

"Considering that adults can also contract poliomyelitis, the maintenance of a high level of immunity in the population is very important. The last immunization of adults in our republic was in 1974, i.e., eight years ago. With this in mind a one-time vaccination of the adult population (beginning with age 20) of the republic will be carried out in April and May of this year. The vaccine will be administered orally. The majority of the people will be vaccinated at their jobs or in schools, and also in polyclinics. Further information about the course of the vaccination is to be provided by local health agencies."

9240

CSO: 1815/21



## EYE CLINIC TO BE BUILT IN TALLINN

Tallinn RAHVA HÄÄL in Estonian 22 Mar 83

[Text] The area in front of the Tallinn Republic Hospital is fenced in. Men of the 3rd Construction Administration have been working there since last fall. The foundation work on the new building started then. Recently a festive moment occurred on the construction site--the cornerstone was laid for the Republic Hospital eye clinic and diagnostic therapy facility. The six-story building is to be finished in late 1984. The entire project will cost almost three million rubles. The construction uses cooperative funds. This includes a 2.6 million ruble contribution by the ESSR Society of the Blind.

The care and diagnostic facilities of the new clinic are discussed by Vaino Tuppits, chief surgeon of the Republic Hospital.

The completion of the new eye clinic will be an effective step toward helping the eye patient. The number of beds will increase. Currently, there are 90 beds for eye patients at the Emergency Hospital and our hospital. In the future all inpatient care will be concentrated in the new clinic, where there will be room for 150 beds. Two wards are designed for therapeutics, one for those requiring operative care. In the operating room, modern equipment, to include lasers, will be used. The necessary instruments have been received and are being used temporarily in the Emergency Hospital. There will also be other new devices in the clinic, such as a dioptron. This is a device that replaces the physician in preparing eyeglass prescriptions. The patient watches something akin to a television screen and once the image is sharp electronics will determine the type of glasses needed.

Care in the new clinic will be comprehensive. This is insured by the application of all kinds of treatment and diagnosis.

At the request of the ESSR Society of the Blind, a rehabilitation center will be established in the clinic where retraining of the blind will take place. With the assistance of a psychologist the vocational aptitude of the blind person will be determined and training can begin while the patient is still in the hospital.

With the completion of the eye clinic the number of beds in the Republic Hospital will increase to 920. This imposes new and higher demands on all activities. The new building will provide good opportunities for meeting them.

The on-call room for the entire complex will be placed there; the laboratories, including the clinical biochemistry, bacteriology, and immunology labs, will receive spacious facilities. The department of functional diagnostics has been well-planned. There diseases of many organs will be diagnosed by examining their functions under added stress. A physical therapy section will be formed, and there will be space for exercise rooms. The needs of the hospital staff have also been remembered. Modern recreation rooms, a barber shop, a small library, and class rooms where physicians can hold their seminars, etc., have been included for staff use.

9240

CSO: 1815/21

## IMPROVEMENTS CALLED FOR IN TAJIKISTAN RURAL HEALTH CARE

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 26 May 83 p 1

[Unsigned article: "Health Service in the Village"]

[Text] One of the important characteristics of our time is the rapidly growing network of hospitals, polyclinics, ambulatory and other medical establishments in rural areas. They are being provided increasingly with modern medical technology and their supplies are being improved by the addition of the newest medicines. The brigade of physicians and other medical workers who protect the health of the village workers is constantly growing.

The inhabitants of distant regions are now less often required to turn for complex medical assistance to the major administrative centers. Multi-departmental central rayon hospitals have appeared in recent years in the Proletarskiy, Pyandzhskiy, Dangarinskiy, Matchinskiy and other rayons. Direct medical service on the kolkhozes and sovkhozes, in the distant settlements and kishlaks [Central Asian villages] is improving steadily. At the start of this year in modern 150-bed buildings, a hospital in the Garauta settlement in the Dzhilikul'skiy Rayon celebrated its housewarming. Opened there at the same time was a well-organized polyclinic handling 250 visits per day, and in which patients are received by qualified physicians.

All of this is one of many manifestations of governmental concern for the health of rural inhabitants. The 26th Party conference and the May and November (1982) Plenums of the Central Committee of the CPSU reaffirmed: concern for the Soviet citizen, the conditions of his labor, way of life, and mental development, is the most important goal of the Party's program. Measures for the social transformation of the village are now regarded as a fundamental part of the Food Program of the nation. Its successful realization should also be accompanied by a steady increase in the level of the medical services provided for villagers.

Much has been done and is being done in the Republic toward this end. The material and technical base of rural health service has been markedly strengthened, its organizational structure is being perfected, and the newest methods and facilities for prophylaxis, diagnosis and treatment are beginning to be put into practice. This is easily seen in the Leninabadskiy Oblast, where the network of interkolkhoz and interr rayon medical services, specialized departments and first-aid teams has recently been expanding rapidly. The

government spends more than a million rubles yearly for the procurement of medical facilities and an additional 600-700 thousand rubles for the replenishment of stocks.

Local Soviets, kolkhozes and sovkhozes, and agronomic associations are able and called to cooperate fully in the reinforcement of the material and technical base of rural health services. It is due to their joint efforts in a number of rayons, in particular the Kabodiyenskiy, Voseiskiy, Kumsangirskiy and others, that problems of the apportioning or construction of new accommodations for medical institutions, living quarters for medical workers and supply of inventories, transport, etc., are being more rapidly solved.

Unfortunately this is far from always the case. Many feldsher-midwife points in the Leningradskiy, Dzhirgatal'skiy, Komsomolabadskiy and other rayons are located in inappropriate places and sometimes do not have sufficient facilities. The reorganization of rayon hospitals is frequently carried out without taking local conditions into account--the state of roads, availability of public transportation, etc., which translates into inconvenience for the population. The construction of health service facilities is delayed in many rural rayons. At the same time the means apportioned in the local budget are at times poorly used.

The local power organs in many rayons of the Gorno-Badakhshanskiy and Kulyabskiy Oblasts are called upon to work more urgently and expeditiously to improve services provided to villagers and to strengthen the material base of medical institutions. To them are fully applicable the requirements of the well-known resolution of the Central Committee of the CPSU and the Council of Ministers of the USSR regarding "additional measures to improve the health care of the population", in which is emphasized the need to raise the quality of medical assistance, to eliminate shortcomings in this area more rapidly, and to improve prophylaxis.

The resolution mentions ways of improving management of health care in rural rayons and expanding the network of physician-manned ambulatoria. The network of stations and substations for first aid and emergency aid will develop more rapidly and the prophylactic trend of the work of ambulatoria-polyclinics will intensify. These and other measures provide for a complex program of efforts to strengthen prophylaxis and fortify the health of the population. It is necessary that not only medical workers but also local Party, Soviet, and labor-union organs participate in these efforts and be called upon, as indicated in the resolution, to provide various kinds of assistance.

Under the conditions prevailing in the Republic, the health care of mothers and children occupies a special place. With the aid of local Soviets, public health organs are called upon to develop a wider network of pediatric and obstetric institutions in rural areas, to oversee more carefully the sanitary conditions in kindergartens, day-care centers and schools, and to carry on active educational work among villagers. The need to intensify this work is due also to the fact that in a number of rayons, in particular in the Sovietskiy, Murgabskiy and others, there is still much to do to improve the medical care of mothers and children.

The problems of improving the sanitary and hygienic conditions of the labor and living conditions of agricultural workers require the constant attention of medical people and of Party and Soviet organs. This takes on ever greater significance in connection with the growing mechanization and chemization of agricultural production. Protection of labor, especially mechanics and people who handle toxic chemicals, and raising the sanitary cultural level of the population at the present time in which mass agricultural work projects are being carried out, are matters of great importance. This is well understood in the Kommunisticheskiy Rayon and a number of other rayons where, in accordance with a previously-constructed plan, medical and sanitary aid is being given to field and farm workers. Practically all medical institutions are participating in this work.

The further development and general improvement of public health in the village are guaranteed by staffs of qualified medical workers. At present the health of the workers of Tadzhikistan is protected by tens of thousands of medical workers, including about ten thousand physicians and 26 thousand intermediate-level medical workers, many of whom are working in villages. Approximately two hundred physician-manned ambulatoria are operating in rural areas, as are hundreds of feldsher-midwife points and other medical establishments.

The best results are being achieved in those areas in which Party Committees and Soviet organs assist in creating in the collectives of medical establishments a situation of high mutual expectation and in eliminating difficulties in good time. It is especially important to show great concern for the creation of normal working and living conditions for rural medical workers, as provided for in our legislation. The absence of this concern causes many of them not to remain in the village.

The Party and government have developed for the 11th Five-Year Plan an enormous program for the further improvement of the medical care and health protection of the population. Its fulfillment is a matter of honor for all medical workers and Party and Soviet organs.

12344

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## UTILIZATION OF OLD-AGE PENSIONERS' LABOR IN AGRICULTURE

Moscow SOVETSKOYE ZDRAVOKHRANENIYE in Russian No 4, Apr 83  
(manuscript received 1 Mar 82) pp 30-33

[Article by L. I. Poplavskaya, M. A. Lopatina, and S. A. Latanyuk; Vinnitsa branch of the Dnepropetrovsk Rehabilitation and Appraisal of Invalids' Working Ability Scientific Research Institute (Candidate of Medical Sciences V. G. Berko, director)]

[Text] The goals of communist construction are tied closely to further, steady growth of agriculture, its material and technical base, and the number of skilled personnel. Increasing production efficiency and incorporating progressive technology require rationalization of organizational forms of labor.

Under the conditions of limited increases in the size of the population capable of working, utilization of old-age pensioners' labor is an extremely important state task. As comrade L. I. Brezhnev noted in his report to the 26th CPSU Congress, it is necessary to "include more of our veterans in labor activity..., naturally taking into account what is possible for them and the demands of the national economy"\*. A number of government decrees and special scientific research projects have been devoted to this problem, in particular the work of the Gerontology Institute of the USSR Academy of Medical Sciences (Ye. S. Stezhenskaya), the Social Hygiene and Organization of Health Institute imeni N. A. Semashko (A. Ye. Shakhgel'dyants and G. N. Dzhavadyan), the Appraisal of Invalids' Working Ability Scientific Research Institute (A-U) (A. A. Kokosh), the Leningrad Appraisal of Invalids' Working Ability Institute (A. A. Dyskin), the Dnepropetrovsk Rehabilitation and Appraisal of Invalids' Working Ability (I. T. Kobylatskiy and coauthors), and others. Most of this research, however, deals with various questions concerning the possibility of utilizing the residual working ability of old-age pensioners in spheres of industrial production.

The economic, medical and social aspects of drawing pensioners into agricultural labor have not yet been studied sufficiently; this would make it

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\*Brezhnev, L. I., Report of the CPSU Central Committee to the 26th CPSU Congress and the Next Tasks of the Party in the Area of Domestic and Foreign Policy, Moscow, "Pravda", 1981, pp 74-75.

possible to develop a number of important organizational measures which would activate revival of labor activities among kolkhoz pensioners.

The goal of our research was the study of the actual participation of old-age pensioners in agricultural production and existing forms for providing incentives for their work; evaluating its efficiency; determining the unhealthful level of factors found in the production environment; the difficulty and stress involved in the agricultural work performed by the pensioners; and evaluating the fatigue dynamics of the pensioners.

The economic foundations of kolkhoz pensioners' work were studied using a group of kolkhozes in the Vinnitsa and Zhitomir Oblasts. The annual reports of oblast agricultural administrations and the oblispolkom labor sections; accounting and financial documents; production charts; indicators of the kolkhozes' economic activity; and industrial and financial plans were all analyzed.

Complex sanitary, hygienic, physiological, and time study research was conducted on the working conditions of 269 women kolkhoz residents in 19 villages in 10 rayons of Vinnitsa Oblast; (47 calf tenders, 118 beet growers, and 104 workers from the vegetable gardening brigade). This group included 134 pensioners between 55 and 59 years old, and 135 women of pre-pension age (50-54 years old). The working conditions were studied in terms of the dynamics of the workday, the workweek, and during different periods of the year when specific types of work were being done.

Hygienic and physiological research methods were used (A. O. Navakatikyan and V. V. Kryzhanovskaya). The difficulty and stress of the operations performed were evaluated according to the classification of the Kiev Labor Hygiene and Occupational Diseases Scientific Research Institute (A. O. Navakatikyan and coauthors); and the level of unhealthful working conditions in the production environment was evaluated according to the classification of the Labor Hygiene and Occupational Diseases Institute of the USSR Academy of Medical Sciences. A total of 8200 hygienic and 237,700 physiological studies were conducted. Methods of parametric statistics were used in the analysis of the material. Among the old-age kolkhoz pensioners, 26.0 percent were engaged in socially useful labor.

In the oblasts studied, the size of the kolkhoz population decreased between 1977 and 1979. The number of old-age pensioners, however, showed practically no change during this interval and accounted for 39.6 percent of the total kolkhoz population.

Of the total number of old-age pensioners, 13.2 percent participate in public kolkhoz production; 54.4 percent of those in the first five years of their pension participate. Old-age pensioners account for 12.0 percent of the total number of working kolkhoz residents. Women account for 82.0 percent of all working pensioners; 18.0 percent are men. The majority of the pensioners do seasonal work (65.5 percent), including 21.6 percent working in specialized brigades and units; the remaining 34.5 percent have regular jobs. The average length of time spent working at pension age is 2.8 years.

A group of workers with high labor activity indicators (over 100 output-days per worker per year), which included people with regular jobs, accounted for 47.3 percent of the total number of working pensioners; the remaining 52.7 percent had between 1 and 100 output-days. Pensioners' labor in terms of output-days per worker is equivalent to 58.0 percent of the labor of working-age kolkhoz workers. With more intensive utilization of the pensioners' labor possibilities, this coefficient can be increased to 75.0 percent.

The kolkhozes lack clearly developed forms for drawing pensioners into labor activity; there are no standardized documents for a differentiated approach to production loads and wages for kolkhoz pensioners, on granting additional privileges, and on measures for moral and material incentives. There is a practice of increased wages for pensioners--10-15 percent over the generally accepted wage rates--only at isolated kolkhozes.

A direct relationship was discovered between the degree of application of various forms of moral and material incentives and the number of working pensioners. At kolkhozes where the pensioners are provided with strong incentives for their labor, the number of working pensioners is between 36 and 49 percent; at kolkhozes with inadequate economic incentives, the number of working pensioners ranges between 9 and 18 percent; at kolkhozes with no incentives of any kind, only 3-6 percent of the pensioners are working.

A study of the activity of pensioners' participation in social production over 20 years (1961-1980) using Vinnitsa Oblast as an example, showed that after the introduction of guaranteed wages for kolkhoz workers and an increase in their material interest in the development of social production, the number of output-days per person per year increased from 53 to 74.

The following forms of moral incentives are applied to draw kolkhoz pensioners into socially useful labor in the oblasts studied: conferring the titles of "Distinguished Kolkhoz Worker" and "Honored Kolkhoz Worker"; awarding the "Veteran of Labor" medal and diplomas of honor; entering the worker's name on the Board of Honor, and so on. Material incentives are realized in the form of additional payments on pensions of up to 60 rubles for many years of labor, double wages on holidays, presentation of valuable gifts and monetary prizes, awarding privilege passes to rest houses and sanatoriums, distribution of free forage, cultivation of private garden plots, and so on.

At the 47 kolkhozes studied, a great deal of attention is given to labor incentives for pensioners, and the forms of moral and material incentives described above are used widely. At 24 percent of the kolkhozes, material incentives are realized in the form of small payments in kind; at 29 percent of the farms, no forms of material incentives are used at all.

A study of the effectiveness of pensioners' labor showed that their contribution to the net income of the kolkhozes is 10 percent. The labor with the greatest results is that done by pensioners with regular jobs and those working in specialized brigades and units. At the economically strong kolkhozes, the proportion of the income resulting from use of pensioners' labor significantly exceeds this indicator. Thus, the socially useful labor of



old-age pensioners is economically beneficial to kolkhozes, even though the system of moral and material incentives for old-age pensioners' labor needs improvement and the experience of the leading farms should be spread more broadly.

A study of the existing forms of organization of labor and rest for kolkhoz pensioners offers evidence of the absence of a differentiated approach to the length of the workday. In connection with inadequate mechanization of basic production processes in agriculture, manual labor is still quite widespread. In the process of their work, kolkhoz pensioners are under constant stress from 35.4 percent of the work time in livestock breeding to 89.0 percent of the time in beet growing. These workers are not fully provided with special work clothes, or special equipment that would improve conditions for resting at work sites in the open fields.

Characteristic features of livestock breeders' (calf tenders') working conditions are the low temperatures and high relative humidity of the air during the cold and transitional periods of the year, and the high temperatures and high relative humidity of the air during the warm seasons. Throughout the entire year the air in the livestock facilities has high levels of ammonium and hydrogen sulfide.

Beet growing, gardening and vegetable farming work often involves application of poisonous chemicals, and is performed under conditions that are influenced by factors in the external environment that are subject to significant changes during the course of the workday and the year.

The sanitary and hygienic studies that were conducted made it possible to evaluate the working conditions of calf tenders throughout all periods of the year.

The physiological research revealed a lower level in the functional condition of the cardiovascular, respiratory, and central and peripheral nervous systems among the kolkhoz pensioners than was found among older working-age people. In addition to this, right around pension age there was a natural vocational selection in terms of muscle strength and endurance, exhibited most markedly among the calf tenders, beet growers and gardeners.

Under the influence of production loads, kolkhoz workers of both groups demonstrated reduced working capacity toward the end of the workday and increased fatigue.

The physiological research that was conducted throughout the dynamics of the workday made it possible to classify the various types of labor performed by the kolkhoz pensioners involved in raising cattle, cultivating sugar beets, tending fruit trees and vegetable crops, as in the second to third category of difficulty and the first to third degree of stress. The degree of fatigue among the pensioners was higher than that found among people of pre-pension age and developed earlier; this indicates the need to optimize their labor and rest.

In order to guarantee continued labor activity of old-age pensioners in agriculture, it is advisable to introduce differentiated norms for the kolkhoz pensioners' labor and wages, taking into account additional length of service; to make broader use of moral incentive forms; to create specialized brigades and units of pensioners; and to apply mechanized labor rationally. Kolkhoz pensioners should have workdays lasting no longer than 6 hours with the opportunity to utilize regular rest breaks.

Implementation of the suggestions indicated above will help promote rational utilization of old-age pensioners' labor under agricultural working conditions.

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UDC 637.146.3(088.8), 637.13(088), 615.356

EFFECT OF 'BALBOBEK' AND 'BALDYRGAN' INFANT FORMULAS ON STATE OF HEALTH AND DEVELOPMENT OF CHILDREN DURING FIRST YEAR OF LIFE

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 2, Feb 83 pp 57-60

[Article by M.V. Baymagambetova, Kazakh Branch, Institute of Nutrition, USSR Academy of Medical Sciences]

[Text] The Kazakh Branch of the USSR Academy of Medical Sciences, Institute of Nutrition has suggested the infant formulas "Baldyrgan" and "Balbobek" for feeding young infants. They have been used in the republic since 1980. Naturally, no data are available on their prolonged use and their effect of the state of health.

We studied physical development and the incidence of disease in infants fed with "Balbobek" and "Baldyrgan" formulas for periods of 6 months or longer. A total of 277 infants were observed, aged from 15 days to 18 months. They were divided into four groups. Group 1 consisted of 89 infants being breast fed; group 2 included 33 infants being fed with "Malysh" mixture; group 3 was made up of 58 children being fed with kefir; and group 4, with 97 infants fed "Balbobek" and "Baldyrgan."

Taking into account the fact that "Balbobek" and "Baldyrgan" contain identical amounts of biologically active substances, we considered it possible to combine infants receiving these products in the same group.

Indexes used to characterize physical development in subjects included weight gain and increase in body size, time taken for circumference of head and chest to equalize, time of eruption of teeth and so forth. Incidence of disease during the period of observation was also considered an important index of the value of the formulas.

In selecting the groups consideration was given to the infant's condition at birth, body weight, degree of fetal maturity, pathologic conditions during birth, the age of the mother, extragenital disease in the mother, and the course of the pregnancy.

Analysis showed that all infants had been born during the period from 39 to 40.5 weeks of pregnancy. The average age of the mothers varied between 22.4

and 24.0 years. Body weight at birth was equalized by groups at  $3220 \pm 53.6$ g,  $3020.5 \pm 45.7$ g,  $3050.8 \pm 45.7$ g and  $3302.7 \pm 47.8$ g respectively. Physiological body weight loss was equalized by groups at  $177.1 \pm 4.0$ g,  $182.1 \pm 6.6$ g,  $177.9 \pm 8.0$ g and  $190.1 \pm 4.3$ g respectively. This did not constitute any statistically significant difference between the groups.

Foods for infants using artificial and mixed formulas were prescribed in accordance with the methodological recommendations contained in the "Basic Principles for Feeding Healthy and Sick Infants during the First Year of Life" (Moscow, 1976).

Dynamic evaluation of increases in body weight and size showed that during the first 6 months of life, in groups being breast fed and receiving "BalbobeK" and "Baldyrgan" formulas the infants' weight and growth were about the same. At the same time, in groups receiving kefir and "Malysh" mixture, size increases were somewhat lower (see table 1).

Table 1. Increase in Body Weight and Size of Infants Receiving Different Food Formulas During the First and Second 6 Months

Group	Increase in Body Weight, g				Increase in Size, cm.			
	In 1st 6 months		In 2d 6 months		In 1st 6 months		In 2d 6 months	
	M $\pm$ m		M $\pm$ m		M $\pm$ m		M $\pm$ m	
Breast fed	4427.0	226.0	2444.0	151.3	14.7	0.7	8.9	0.6
Kefir	4286.2	203.5	2250.8	173.8	13.9	0.9	8.0	1.0
"Malysh" mixture	4218.0	189.3	2346.1	190.0	13.2	1.0	5.6	0.5
"BalbobeK" or "Baldyrgan"	4523.8	183.5	2418.0	123.5	15.3	1.1	9.0	0.7

In normally developing infants the circumference of the head and chest equalize by the fourth month (Ye.P. Stromskaya). In the infants we observed, in all groups the time taken for equalization of the circumference of head and chest was  $3.4 \pm 0.34$  to  $3.7 \pm 0.14$  months. In a number of cases, however, it occurred earlier. Among those infants in which early equalization occurred, 10.2-13.8% had been breast fed or received kefir or "BalbobeK" or "Baldyrgan," and 26.3% had received the "Malysh" mixture.

We also used the weight-to-growth index for objective evaluation of the infants' physical condition. In 3-month-old infants fed with "BalbobeK" or "Baldyrgan" products, kefir and mother's milk it was 97.0, 98.1 and 97.5, while in infants receiving "Malysh" mixture it was 120, with a mean of 97-102 (N.N. Usov). At 1 year the Erisman index in all groups matched the physiological variations in the index in healthy infants (from +13.5 to +10).

We took into account development of the skeletal system. The deciduous teeth erupted earlier in infants who were breast fed or who received "BalbobeK" or "Baldyrgan." At 1 year they had more erupted teeth than infants receiving kefir or "Malysh" ( $P < 0.05$ ). Closure of the large fontanelle occurred by 1 year in a larger percentage of infants who were breast fed or received "BalbobeK." (see table 2).

Table 2. Periods for Eruption of Deciduous Teeth and Percentage of Closure of the Large Fontanelle by Age 1 Year in Observed Infants.

Feed	Eruption of first tooth (months)		No of teeth at 1 year		Percentage closure of large fonatelle at 1 year
	M ± m		M ± m		%
Breast fed	6.8	0.1	7.3	0.3	66.66
Kefir	7.3	0.2	6.0	0.4	51.72
"Malysh" mixture	8.3	0.3	4.7	0.5	39.40
"Balbobek" or "Baldyrgan"	6.9	0.2	7.1	0.2	69.38

The incidence of disease also indicates the effect of nutrition on the infants' bodies. We considered first diseases associated with the features of nutrition. For infants the nature of the feed is one of the important factors affecting the formation of the body's defensive mechanisms. Data from these studies are shown in figure 3.

Table 3. Incidence of Disease Among Infants Reared in Different Ways

Nosological unit (disease)	Number of Infants Sick During Rearing							
	Breast Fed		Kefir		"Malysh"		"Balbobek" or "Baldyrgan"	
	Abs. no.	%	abs. no.	%	abs. no.	%	abs. no.	%
Infectious and parasitic diseases								
Intestinal infections	7	8.3	11	18.9	13	39.3	3	3.3
Diseases of endocrine system, nutritional and metabolic disorders, rickets	10	11.9	16	31.0	14	42.4	11	11.3
Hypotrophy	2	2.3	1	1.7	5	15.5	2	2.2
Blood diseases and diseases of hematopoietic organs								
Alimentary anemia	21	25.0	17					
Diseases of respiratory organs, pneumonia	4	4.5	7	29.3	13	39.8	17	17.5
Diseases of skin and subcutaneous tissue				12.6	10	30.0	9	9.2
Pyoderma	6	7.1	2	3.6	2	6.6	8	8.2
Exudative diathesis	12	12.4	15	25.8	9	27.2	10	10.3

It can be seen from table 3 that intestinal infections were recorded most frequently in the group receiving "Malysh" mixture (39.3%), less often in the group receiving kefir (18.9%) and even more rarely in groups being breast fed (8.3%) and receiving "Balbobek" or "Baldyrgan" (3.3%).

Consequently, the "Balbobek" and "Baldyrgan" products can be used extensively to prevent gastrointestinal disorders, especially in very young infants.

Other diseases associated with the features of rearing include hypotrophy, rickets and alimentary anemia.

Nutritional disorders occurring in connection with great loads on the metabolic processes and deficiencies in the intake of various food substances lie at the basis of hypotrophy in infants.

According to data from our observations, hypotrophy was recorded most often in infants being fed with the "Malysh" mixture (15.5%) and least often in infants receiving kefir (1.7%), mother's milk (2.3%) and the "Balbobek" and "Baldyrgan" products (2.0%).

Rickets was recorded most frequently in infants being fed with the "Malysh" mixture (42.4%) and kefir (31.0%), and much more rarely in infants being breast fed (11.9%) or receiving the "Baldyrgan" lactic fermentation mixture (11.3%). Reducing the cases of this disease is of great practical significance since even mild forms of rickets affect the infant's development and increase the incidence of pulmonary inflammation and intestinal infections (A.B. Bisenova et al). In this case the use of "Balbobek" and "Baldyrgan" is of prophylactic significance.

Alimentary anemia was also recorded most often in the group in which infants received the "Malysh" mixture (39.8%), and considerably less frequently in infants being breast fed (25.0%) and receiving the "Balbobek" and "Baldyrgan" lactic fermentation products (17.5%;  $P < 0.01$ ). Hence, these products are sufficiently effective in preventing diseases associated with nutritional disturbances.

A large percentage of infant pathologies during the first year of life are diseases of the respiratory organs, most often typified by metabolic disorders. The occurrence of acute respiratory viral infections is largely associated with the body's defensive mechanisms. Accordingly, the incidence of these diseases can be used as one of the tests in evaluating the health-giving properties of a product.

We showed that pneumonia is recorded most often among infants receiving the "Malysh" fresh mixture (30.0%) and much less often among the groups in which "Balbobek" and "Baldyrgan" (9.2%) or kefir (12.6%;  $P < 0.02$ ) were given.

Exudative diathesis occupies a special place in the pathology of very young infants. It results in a protracted course for any infectious disease, for example, acute respiratory viral diseases and pneumonia. In 1970 M.G. Mukovnikov diagnosed this disease in 56% of infants in the first year of life. They included 50% in whom signs of allergic disease were observed after the age of 1 year. According to M.S. Maslov's figures, exudative diathesis has been found in one-third of infants in the first 2 years of life.

In our observations this disease was recorded most often in groups fed with the "Malysh" mixture (27.3%) and kefir (25.8%). In infants receiving "Balbobek" and "Baldyrgan" or being breast fed, exudative diathesis was encountered less often (10.3% and 12.4% respectively;  $P < 0.05$ ).

In conclusion we note that thanks to the effect of "Balbobek" and "Baldyrgan" there has been a drop in the incidence of rickets, alimentary anemia and hypotrophy, and also pneumonia and gastrointestinal infections, which may be associated with enhancement of the body's defensive mechanisms. A trend has been noted toward a decrease in the incidence of exudative diathesis. In infants fed these products, physical development is close to that in breast fed infants.

Thus, the findings give grounds for thinking that "Balbobek" and "Baldyrgan" containing biologically active substances play an important role in the body, and that this is particularly apparent when infants receive these products over long periods. The reduced incidence of disease and the good physical development of very young infants should be regarded as confirmation of this.

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CSO: 1840/525

## BRIEFS

NEFTEZAVODSK HOSPITAL--Construction of a hospital complex has been started in Neftezavodsk. It will be one of the largest medical establishments in the oblast. More than R4.5 million have been allocated for its construction. The health complex will include five major buildings connected by walks. They will contain a maternity home and various therapeutic facilities with 300 beds. The complex will also include a polyclinic capable of handling a patient throughput of 800 per shift. The plan calls for providing all treatment and procedure rooms, operating suites and other medical services with the most up-to-date medical equipment and also complex diagnostic equipment. The future city of the oil and chemical workers is growing and being provided with more amenities with each passing year, and its population is growing. This complex is also being built in order to improve services. Other cultural and everyday projects are under construction in addition to housing. Since the start of the five-year plan alone a trading center, kindergartens and creches, a vocational and technical school and other important projects have been commissioned. [By B. Dzhumayev] [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 1 Mar 83 p 2] 9642

UFA HOSPITAL COMPLEX--A general hospital complex with 1,000 beds and a polyclinic able to treat 800 patients per shift has been commissioned in the Lesoparkovskiy housing development in Ufa. Estimated costs are more than R1 million. Money for the construction was made available from the communist subbotnik fund. The complex covers an area of 12 hectares. All treatment, auxiliary treatment and training departments are concentrated in the main 9-story building. Hospital rooms are organized for four and two patients and as single rooms. The first microsurgery, maxillofacial surgery and neurosurgery departments in Bashkiria will be opened here. [By R. Fayzrakhmanov] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 2 May 83 p 1] 9642

CSO: 1840/519



## EFFECT OF PROTEIN AND VITAMIN DIET DEFICIENCY ON BLOOD SERUM LIPID COMPOSITION

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 2, Feb 83 pp 27-30

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[Abstract] Male August rats (28, initial weight 70-90 g) were kept on experimental diets (1--balanced diet; 2-- a diet with wheat gluten as a source of protein and with a deficiency of retinol, tocopherol and ascorbic acid; 3-- a diet with wheat gluten as a source of protein and 4-- a diet deficient in retinol, tocopherol and ascorbic acid) for 60 days in a study of peculiarities of changes of the composition of the serum lipoproteins, lipids and cholesterol esters in the rats. Blood serum lipids and cholesterol esters were determined by thin-layer chromatography and the serum lipoprotein spectrum was studied by disk-electrophoresis. Rats on nutrient-deficient diets showed a reliable increase of low density lipoprotein and a tendency toward reduction of very low density lipoprotein while the high density lipoprotein level was unchanged. There was a reduction of concentration of phospholipids, free cholesterol and triglycerides while the free fatty acids level rose. The esterized cholesterol level decreased. The serum lipoprotein spectrum changed abruptly in rats on diets containing wheat gluten. The serum low density lipoprotein level increased while the very low density lipoprotein and the high density lipoproteins decreased. The albumin level tended to decrease while there was a significant increase of concentration of all lipid fractions except the serum phospholipids level which decreased. The changes observed suggest a qualitatively new metabolic state arising in the rat organism due to combined shortages of vitamins and proteins. These findings suggest the possible importance of similar factors in the rise of some diseases in man. References 7 (Russian)

[524-2791]

## SUMMER PUBLIC HEALTH CONCERNS

Moscow MOSKOVSKAYA PRAVDA in Russian 5 Jun 83 p 1

[Abstract] Summer brings special concerns for the public health service as for all other municipal services. This article discusses some public health problems in Moscow, including tardy collection of trash, unauthorized dumping and failure to maintain construction sites clean. Large numbers of children on bus trips represent a public health and safety problem. Continuing outbreaks of acute intestinal infections indicate a need for more concern in this area. Summer should also be used more fully for improvement of the physical condition of the children. It provides an opportunity for children with chronic diseases to get out into the fresh air. This should also be considered for adult patients. Areas with problems of discipline among workers at polyclinics are specifically named. Summer is also the best time for repairs and maintenance at hospitals and other public health institutions. Unfortunately, not all institutions take advantage of the season properly. [538-6508]

UDC 616-082:618.2/7-1(575.4)

## DEVELOPMENT STAGES OF THERAPEUTIC AND PROPHYLACTIC ASSISTANCE TO MOTHERS AND INFANTS IN TSSR

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 12, Dec 82 pp 17-19

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[Abstract] There wasn't a single obstetrical bed in Turkmenia prior to the October Revolution; the births were attended to at homes under poor sanitary conditions with resulting high mortality of mothers and children. After the revolution this situation improved. Both ambulatory and hospital units were organized for obstetrics and gynecological service. Regular training of medical support personnel began in late 20's and early 30's. During the decade of collectivization women began to enter industrial jobs at an increasing rate. The network of medical service increased accordingly so that in 1940 about 86% of the population were covered by it. After the war, special honors were awarded to mothers with more than 10 children. Working mothers as well as single mothers began to receive child support. In 1982 there were 3372 obstetrical beds in Turkmenia, 879 gynecological beds serviced by 530 obstetricians/gynecologists. Support in rural areas of the country intensified. New clinical and diagnostic techniques introduced through these centers resulted in faster recovery of patients and mothers. [488-7813]

## PROBLEM OF UNIVERSAL PREVENTIVE DISPENSARY SERVICES

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 4, Apr 83  
(manuscript received 21 Jun 82) pp 8-14

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[Abstract] One principle of Soviet health is preventive maintenance. Applying this principle since the beginning of Soviet power, public health has been significantly improved in terms of reducing morbidity, particularly epidemic morbidity, invalidity and mortality. At present all medical institutions participate in preventive dispensary (dispensarization) services to the population. Soviet medical personnel have performed great volumes of dispensarization work. City polyclinics alone serve 10.8% of the adult population. The National Conference of Active Public Health Workers on 10 December 1981 heard from the USSR Minister of Health S. P. Burenkov that 44% of the population received preventive medical examinations in 1980, 17.3% were under continuing observation, for a total of 60.6% receiving active dispensarization observation. Groups of dispensarization observation need to be standardized. The solution of the task of universal dispensarization services depends to a great extent on polyclinics which have become the leading institutions in such services and which will play an increasing role in the future. Based on medical-sanitary units, it is easier to accumulate experience in tracing the dynamics of the health of the working population and evaluate the effectiveness of all dispensarization services. The most important trends are: 1) detailed study of conditions of labor; 2) questionnaires distributed among workers on special problems; 3) study of access by workers of medical services where they work; 4) systematic combined medical examination of workers in specially organized diagnostic centers; and 5) complete medical examinations by teams of medical specialists at industrial enterprises. The planning of preventive work in the solution of problems of universal dispensarization services can be used to test hypotheses concerning the introduction of specialized services, providing assistance to physicians in the servicing of patients at home, the expansion of the functions of static offices for the maintenance of medical documentation on dispensarization services and its reproduction and the accounting for dispensarization work and its effectiveness. The use of computers will facilitate all of this work and allow significantly more time to be turned toward preventive health maintenance services. Thus, the transition to universal dispensarization services of the population requires the study and solution of many problems. References 11 (Russian).  
[491-6508]

## ECONOMIC ASPECTS OF REDUCING MORBIDITY OF CIRCULATORY SYSTEM DISEASES

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 4, Apr 83  
(manuscript received 13 Jul 82) pp 25-30

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[Abstract] The purpose of this study was to determine the economic loss resulting from temporary loss of labor services resulting from circulatory system diseases and the economic effect of its reduction at one of the largest enterprises in Ternopol'--the cotton combine--during a period of five years (1976-1980). The initial data necessary for the economic calculations were obtained using primary documentation. Economic losses were determined by a method suggested by E. M. Kulagina. The dynamics of morbidity with work time loss for general diseases showed an increase in the number of cases of temporary work loss in 1977, 78 and 80 the figures being 68.9, 82.6 and 76.5 per 100 workers, as against 52.9 cases in 1976. Circulatory system diseases, in contrast, showed an increase in the number of days of temporary work loss in 1977, 1978 and 1980 (21.7, 25.4 and 24.2 days in comparison to 18.2 days in the base period of 1976), with significant fluctuations in the number of cases involved. Each year at the combine the number of workers decreased, but there was an increase in the productivity of labor, expressed as overall production per worker. Rheumatism was found to be the disease which caused the greatest amount of lost work time, due to its severity and long continuation as well as frequent recurrence, plus the frequent need for hospitalization. References 3 (Russian).  
[491-6508]

UDC: 614.2:664:339]:008(47+57)](574)

## TASKS OF PUBLIC HEALTH ORGANS AND INSTITUTIONS IN KAZAKHSTAN IN IMPLEMENTING THE FOOD PROGRAM

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 2, Feb 83  
(manuscript received 6 Jul 82) pp 8-13

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[Abstract] The food program of the USSR approved by the May 1982 plenum of the CC CPSU is an important component of the economic strategy of the party for the present decade. Achievements of Kazakhstan in supporting public health during the 10th Five Year Plan are summarized: construction of 32 central rayon hospitals and other organizations with a total capacity of 4500 beds, polyclinics with a capacity of 6600 visits per shift, construction of 11 agricultural uchastok hospitals with ambulatory patient treatment units, improvement of ambulatory-polyclinic services to the population by a factor of almost 1.2 in the past 10 years and an increase in the number of physicians

by almost a factor of 2 since 1971. The average hospital size has now reached 610 beds in cities, 214 beds in towns, 170 beds for rayon hospitals in the country and 35 beds in rural areas. In 1982 over 90% of the graduates of medical institutes in Kazakhstan entered public health service in rural areas. Of 749 rural uchastok hospitals in Kazakhstan, only about 33 have 3 or more physicians, just as many have 2 and one third have only 1 physician. This must be improved, as must be the situation with feldsher-midwife points and kolchoz birth clinics. The chemization of agriculture will go far to assure implementation of the food program. Public health organs must therefore do a great deal to protect agricultural workers from the ill effects of contact with agricultural chemicals. Agriculture must be virtually completely mechanized by 1990. Public health workers must monitor the training of workers for the use of new equipment and protect them from and treat them for injuries.  
[480-6508]

UDC: 362.11:658.52.011.56

#### FIRST RESULTS OF OPERATION OF AUTOMATED CITY CLINICAL HOSPITAL ADMINISTRATIVE SYSTEM

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 2, Feb 83  
(manuscript received 8 Jun 82) pp 23-29

BOYADZHYAN, V. A., DAYON, A. M., KOZAK, V. S., DOVGAN', Ye. G. and KOZAKOVA, V. B., Second Moscow Medical Institute imeni N. I. Pirogov; Republic Information-Computer Center, RSFSR Ministry of Health; City Clinical Hospital No. 31, Moscow

[Abstract] During the past 10 years extensive development of hospital information systems has been begun in many hospitals of our own country and abroad, using modern computer equipment and methods of mathematical economics. A system for a large multiple profile hospital is being developed at the city clinical hospital No 31 in Moscow. The system is to be oriented for a typical multiprofile hospital with up to 1500 beds, must be economically justified, allow expansion of functions performed with a minimum of new equipment and should not disrupt the accustomed working conditions of medical personnel. Development is being performed in stages. In the first stage after careful analysis, the development strategy was selected, consisting in the use of domestic minicomputers and microprocessors with a common system organization. However, an M-6000 computer was initially used to automate accounting and analysis of patient activity, planning of medications for patients, planning and monitoring of bed use and improvement of the organization of the diagnostic and therapeutic process. Each of these functions is briefly described. The development of the first stage of the system and its commercial operation have allowed significant experience to be accumulated in interaction with hospital personnel under actual conditions. Operation of the first stage has revealed shortcomings, primarily the lack of unity of organization of technological processes, impossibility of highly effective collecting and processing of information and therefore of completely satisfying the information requirements of the user, due to multiple duplication of data stored in

the system, repeated input, lack of a single system of information protection and the practical impossibility of systematic machine analysis of all aspects of hospital operations. These shortcomings have largely defined the strategy for further development using the total systems approach, details of which are not given. Figures 2; references 9: 5 Russian, 4 Western.  
[480-6508]

UDC: 614.88:658.387

# ORGANIZATION OF THE OPERATION OF EMERGENCY AID STATIONS [SKORAYO POMOSHCH]

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 2, Feb 83  
(manuscript received 18 Aug 82) pp 38-40

GRINBERGENE, B. A., KRASNOVA, M. N., GOLETSKENE, S. S., ZHILINSKENE, G. S. and CHEKUOLIS, A. Yu., Lithuanian SSR Ministry of Health, Republic Department for Scientific Organization of Labor, Scientific Research Institute of Experimental and Clinical Medicine, Lithuanian SSR, Vilnius ; All-Union Scientific Research Institute of Social Hygiene and Organization of Public Health imeni N. A. Semashko, Moscow

[Abstract] There should be two or three substations for provision of emergency medical services in Vilnius, particularly in the eastern part of the city. However, buildings are not available for substations and therefore the emergency medical aid system operates by a sector servicing system, dividing the city into 8 sectors. The purpose of the sector system is to avoid transportation of emergency surgical and other medical teams over long distances and to minimize the number of ambulances necessary to provide satisfactory services. The communications lines, signalling and automation equipment are serviced by technical personnel from the administrative-economic division headed by the senior radio engineer of the emergency medical service. The station has two central radio transmitters for communications with emergency vehicles throughout the city. The connecting link between the administrative and other subdivisions is the senior duty physician of each shift. Vilnius has never had emergency medical polyclinics, and therefore no reorganization from this form to the sector form of emergency medical services has been required. Specialization of emergency teams allows emergency medical aid to be provided at a high level of expertise. In all, an average of 143,200 emergency calls are received in the city each year, though the number of calls has tended to decrease in recent years due to improved preventive medical and home medical services. In 1981, ambulances arrived within 15 minutes in 78.4% of cases. From 16 to 18% of the patients who were the subjects of these calls were hospitalized.  
[480-6508]

INCREASING EFFECTIVENESS OF PHYSICIAN'S ADVANCED TRAINING

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 2, Feb 83  
(manuscript received 20 Apr 82) pp 48-49

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[Abstract] A monthly cycle of thematic continuing education has been held at the author's institute since 1980, involving 27 instructors from continuing education and medical institutes. The most important problems covered have been scientific teaching of medicine, optimization and intensification of the teaching process, evaluation of effectiveness of continuing education. Primary mention has been given to methodologic problems of improving the teaching process. The results have been improvement in the qualifications of physicians. Each student instructed at the Institute for the Advanced Training of Physicians makes up his own course plan which must be approved by the administration of the institute, then follows the plan to improve his qualifications as a physician. An example of a plan is presented.  
[480-6508]

CONTINUING EDUCATION AND MORAL INDOCTRINATION OF PHYSICIANS--A SINGLE PROCESS

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 2, Feb 83  
(manuscript received 20 Jul 82) pp 53-56

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[Abstract] This article discusses an earlier article entitled "The Problem of Increasing the Effectiveness of Improvement of the Qualifications of Medical Personnel" (this journal No 1, 1982 pp 41-44). The authors disagree with some of the concepts expressed in the previous article. For example, the concept of effectiveness of improvement of qualifications was insufficiently defined in the previous article. The present authors believe that the leaders of public health organizations and institutions must provide the necessary volume of theoretical knowledge, ability and skill in their specialties at today's scientific level, combined with the moral aspects of the problems of supporting the health of the public, stimulating students in continuing education courses to manifest initiative, indoctrinating them in the spirit of implementing all of their knowledge in practice. The needs of public health are satisfied when physicians, after attending continuing education courses, become more active and enthusiastic participants in implementing everything which is new, enthusiastic in the struggle for high quality and culture of

medical servicing of the public. The Soviet specialist of today is a capable organizer, able to apply the principles of scientific organization of labor in practice. He can work with people, values collective experience, learns from the opinions of his comrades and critically evaluates that which has been achieved. The modern specialist is a man of high culture, broad erudition, a true intellectual of the new socialist society.  
[480-6508]



## VETERINARY MEDICINE

UDC 619:614.9:614.48:636.083.1+632.93:631:462+631.863

### USE OF METAFOR IN DISINFECTION

Moscow VETERINARIYA in Russian No 5, May 83 pp 23-24

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[Abstract] Metafor is a byproduct of methionine production. Its use as a disinfectant is described. It is a stable liquid easily soluble in water; chemically it is a mixture of aldehydes and other additives. It is moderately toxic to warm-blooded animals. Its bactericidal activity is higher than that of formaldehyde. It does not polymerize even at  $-18^{\circ}\text{C}$ ; it has a low corrosive activity. Metafor appears to be an effective disinfecting agent for living quarters, soil and liquid fertilizers. Metafor biodegrades twice as fast as formaldehyde.

[493-7813]

UDC 619:576.809.7:614.47:616.988.43

### LOCAL IMMUNITY DURING VACCINATION AGAINST FOOT AND MOUTH DISEASE

Moscow VETERINARIYA in Russian No 5, May 83 pp 29-30

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[Abstract] Experimental results were reported of a study of the effect of various concentrations of aluminum hydroxide gel and of the immunizing antigen of inactivated foot and mouth disease virus used in preparation of vaccine on the degree of specific local and humoral immunity. The dose of the vaccine used for revaccination of cattle was determined as well as its effect on local immunity and on the dynamics of its development during the first post-vaccination days. It was shown that protective reactions of an organism begin to be manifested from the moment the causative agent contacted mucous membrane of the macroorganism. During parenteral vaccination of cattle, the local immunity depended on the concentration of the immunizing agent more than the humoral immunity. Revaccination of the animals intensified local immunity, while the serum level of virus neutralizing antibodies remained unchanged.

[493-7813]

## VACCINE-PROPHYLAXIS IN CONTROL OF BRUCELLOSIS

Moscow VETERINARIYA in Russian No 5, May 83 pp 31-32

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[Abstract] Vaccination as a prophylactic step in control of Brucellosis is not advisable. It can only be used as a complement to other measures undertaken for liquidation of infection. The commonly used vaccine from strain 19 manifests a very-long-lasting post-vaccination titer in serum which is non-distinguishable from that of infected animals. This strain is retained in the udder and is excreted with milk. When applied late during pregnancy, it could lead to abortions. The proper way of applying vaccination is to use it on healthy young animals which then could be utilized in restocking the diseased herd. New, better vaccines must be yet developed for prophylactic purposes.

[493-7813]

## THERMOSTABILITY OF NEWCASTLE DISEASE VIRUS OF STRAIN BOR-74 VGNKI

Moscow VETERINARIYA in Russian No 5, May 83 pp 35-36

KREYMER, Yu. Kh., All Union State Scientific Control Institute of Veterinary Preparations

[Abstract] Exposing Newcastle disease (ND) virus to heat leads to alteration of its infectious and hemagglutinating activity. In this paper experimental results were reported of the study of thermal stability of infectious and hemagglutinating properties of BOR-74 VGNKI strain, La-Sota, B<sub>1</sub> and F viruses of ND in native and lyophilized states. Thermal stability of lyophilized strains was considerably higher than that of native strains. But a 21-day exposure to 37°C made even the lyophilized strains unsuitable for practical use. The BOR-74 VGNKI strain showed a relatively high thermal stability of both infectious and hemagglutinating activities; La-Sota showed high resistance of the infectious, but low hemagglutinating activity; B<sub>1</sub> exhibited the opposite property: high hemagglutinating and low infectious resistance and F strain showed both properties to be thermally unstable.

[493-7813]

AEROSOL VACCINATION METHOD FOR FURRY ANIMALS AGAINST PLAGUE

Moscow VETERINARIYA in Russian No 5, May 83 p 41

DYMIN, M. A., SAFONOV, G. A. and CHICHKANOV, V. P. All Union Scientific Research Institute of Veterinary Virology and Microbiology

[Abstract] During recent years breeding of caged animals expanded greatly in the USSR. One of the problems associated with this was the need to vaccinate all these animals. A mobile unit was developed permitting aerosol delivery to semiopened sheds housing these animals. The vaccination became effective seven days after spraying and retained its protective strength for 6 months. No degenerative or necrotic changes were observed in sprayed animals. Complement binding antibodies appeared on the 14th day and reached maximum titers on the 21st day post vaccination. Two months after aspiration of vaccine the level of antibodies dropped but the immunity was retained.

Figure 1.

[493-7813]

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EFFECT OF NEGATIVE AIR IONS ON CALVES

Moscow VETERINARIYA in Russian No 5, May 83 p 56

ABRAMOV, S. S. and GANKOVICH, V. I., Vitebsk Veterinary Institute

[Abstract] The effect of negative air ions was studied on 60 calves beginning on their 21st day of age. Three groups were investigated: one exposed to air containing 90,000 negative aeroions per  $\text{cm}^3$  of air for 6 hrs daily, one exposed to 150,000 ions per  $\text{cm}^3$  of air for 6 hrs daily and a control group with no exposure to aeroions. All parameters showed optimal levels in the high exposure group: increase in bactericidal activity, higher total protein content, higher concentration of sulphydryl groups and lowest incidence of bronchial pneumonia. Microbial contamination of the atmosphere was identical in all three groups at the beginning of the experiment. At the final reading, the air contamination was highest in the control group and lowest in the high dose group. Thus it was shown that high concentration of negative aeroions has a positive effect on growing calves.

[493-7813]

## WAYS OF IMPROVING QUALITY OF PORK MEAT WITH INDUSTRIAL PRODUCTION TECHNOLOGY

Moscow VETERINARIYA in Russian No 5, May 83 pp 66-68

BOGUSH, A. A., Belorussian Scientific Research Institute of Experimental Veterinary Medicine

[Abstract] A number of factors affecting meat quality was studied on 102 pigs weighing 110-120 kg. Specific organs studied included the long back muscle, flexing antibrachial muscles, lymphatic glands, liver and kidneys. As a rule, pigs grown in a production complex showed inferior quality indices than animals obtained from traditional farms. These differences were intensified when the animals were exposed to stress prior to slaughtering. Time spent in transit between the breeding farm and meat processing plant had a definite effect on meat quality; it was best with shortest transit time. Overall, intensive breeding of pigs, limited mobility and inadequate food intake led to lower resistance of pigs' organisms; increased sensitivity to stress factors during their development, transportation and holding period in the slaughter house, and as a consequence resulted in poor meat quality. To cut losses and to improve meat quality, stress-resistant animals should be developed and the animals should be delivered to the slaughter house in the shortest time possible.

[493-7813]

## EXPERT EVALUATION OF FROZEN PORK

Moscow VETERINARIYA in Russian No 5, May 83 pp 68-69

SHESTAKOV, Yu. M., Saratov Veterinary Institute

[Abstract] Results were reported of the experimental investigation of storage of frozen pork. The meat was frozen at  $-26^{\circ}\text{C}$ ; test samples were taken before freezing and after 3, 6, 9, and 12 months of storage. During storage the meat darkened somewhat. The odor and taste of meat stored for 6 months remained on an acceptable level. The acid and peroxide numbers did not differ from fresh meat levels. At the 9th month of storage the fat began to show granularity, the acid and peroxide numbers increased substantially but still within normal ranges. After 12 months the fat changed its color to yellowish grey, its acid number increased five-fold and the peroxide number doubled. Bone marrow also appeared to be unfit for consumption, but the meat deteriorated much slower. No changes were noted between the meat from animals raised on natural food at traditional farms and those from industrial complexes. It was concluded that a 9 months storage of pork at  $-16$  to  $-18^{\circ}\text{C}$  appeared to be the limit for freezing pork.

[493-7813]

EVALUATION OF MEAT AFTER ADDITION OF UREA TO ANIMALS' FEED

Moscow VETERINARIYA in Russian No 5, May 83 pp 70-71

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Ukrainian Scientific Research Institute of Experimental Veterinary Medicine

[Abstract] Recently, several methods were developed for the utilization of urea in animal feed. The goal of the present study was to evaluate the quality of meat from beef fed on urea feed, an amido-concentrate additive obtained from extrusion of grain and urea and isobutylidenediurea. No patho-anatomic differences were found between experimental and control animals. Laboratory tests also showed no differences in pH, coefficient of acidity, protein and total nitrogen content, nor in any other physical or chemical tests. There was an increase in the weight of animals fed urea supplement and a corresponding saving in feed.

[493-7813]

## CONFERENCES

### BRIEF

DOSIMETRY CONFERENCE--The fourth all-union conference on microdosimetry took place 10-18 April in Narva-Yyesuu at facilities of the Estonian "Noorus" international youth center. It was organized by the Moscow Order of Labor Red Banner Institute of Engineering Physics with the cooperation of the USSR Academy of Sciences Scientific Council on Radiobiology. A seminar of young scientists also took place with the support of the Komsomol Central Committee and the Estonian Komsomol Central Committee. Microdosimetry is the branch of modern science that studies the physical processes associated with the effect of ionizing radiation on living and nonliving objects. The reaction of this radiation with a substance leads to various effects that can be used for scientific and practical purposes. It is this that determines the wide applications of ionizing radiation in various sectors of the national economy and in medicine and biology. The effective and purposeful use of this radiation requires an understanding of the complex processes it causes in an irradiated object. These processes are especially complex in living organisms. It has been established that the initial radiation effects in the organism result from the radiation energy absorbed by such structures as the cell nucleus, chromosomes, DNA molecules and so forth. It is particularly important to make the correct predictions about the expected consequences of irradiation, while on the other hand, it is important to gain a more detailed and deeper understanding of the mechanisms that lead to these consequences; knowledge of these mechanisms makes it possible to control the process of radiation effects, reinforcing them if they are useful and attenuating them if harmful. The conference, which was attended by physicists, mathematicians, biologists and physicians, discussed the status of research in the field of microdosimetry, clarified the paramount problems, and outlined measures to coordinate work at various scientific establishments. The young scientists present at the conference heard lectures from leading specialists and discussed the results of their own research. [By V. Ivanov] [Text] [Tallinn SOVETSKAYA ESTONIYA in Russian 6 May 83 p 3] 9642

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